UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 7
901 NORTH 5TH STREET
KANSAS CITY, KANSAS 66101

JAN 16 2009

Earl Pabst, Deputy Director
Division of Environmental Quality
Missouri Department of Natural Resources
P. O. Box 176
Jefferson City, Missouri 65102

Dear Mr. Pabst:

The United States Environmental Protection Agency (EPA), Region 7, has completed its review of public comments regarding proposed changes made by EPA to Missouri's 2004/2006 Clean Water Act (CWA) Section 303(d) list, as described in the September 24, 2008, decision letter to the Missouri Department of Natural Resources (MDNR).

EPA reviewed Missouri's 2004/2006 303(d) list of impaired waters, and had determined that Missouri's list of water quality limited segments still requiring Total Maximum Daily Loads (TMDLs) did not include certain waters and pollutants required to be listed. EPA partially approved and partially disapproved Missouri's 303(d) list and provided its rationale for this action in two letters to MDNR dated September 27, 2007, and September 24, 2008. EPA then issued a public notice on September 24, 2008, seeking written comments on EPA's decision to add/restore 135 water body/pollutant pairs to Missouri's 2004/2006 303(d) list. The 60-day public comment period closed on November 24, 2008. Pursuant to Region 7's revised method for public noticing decisions on 303(d) lists (as described in the September 12, 2008 Federal Register Vol. 23, No. 178 p. 52928), EPA placed its public notice and the associated decision letter on the EPA-Region 7 website. The record supporting EPA's decision was available upon request. EPA's request for public comments was limited to decisions to add or restore specific water body/pollutant pairs to Missouri's 2004/2006 303(d) list.

Based on EPA's review of the comments, Region 7 is amending and removing six water body/pollutant pairs it had previously proposed to add/restore to Missouri's 303(d) list. EPA is approving the delisting of Hickory Creek (WBID 588) and Long Branch (WBID 602) for unknown pollutants based on field data provided by MDNR subsequent to the submission of their 2004/2006 303(d) list. EPA reviewed that data during the public comment period and is including its evaluation in this responsiveness summary. EPA is also approving the delisting of two portions of Sewer Branch (WBID 860 and 860U) for unknown pollutants based on a reevaluation of the record. EPA is no longer proposing to add Fishpot Creek (WBID 2186) and Lake St. Louis (WBID 7054) to the list as impaired by bacteria and mercury, respectively, because commenters identified errors in the original assessment. At this time, the data do not

support identifying these six water body/pollutant pairs as impaired. The enclosure to this letter provides a detailed responsiveness summary to public comments the Agency received and includes a consolidated summary of EPA's decision on Missouri's 2004/2006 303(d) list.

EPA would like to discuss this decision further with MDNR as you prepare your 2008 303(d) list for submission. Please contact me at 913-551-7401, or John DeLashmit, Chief of the Water Quality Management Branch, at 913-551-7821.

Sincerely,

Mary Jane Minter for

William A. Spratlin
Director
Water, Wetlands and Pesticides Division

Enclosure

cc: Missouri Department of Natural Resources:
Mr. Rob Morrison
Mr. John Ford
Mr. Phil Schroeder
Mr. John Hoke
Mr. Refaat Mefrakis

ENVIRONMENTAL PROTECTION AGENCY – REGION 7

PUBLIC NOTICE of the

PROPOSED DECISION on the MISSOURI 2004/2006 303(D) LIST –

SUMMARY OF PUBLIC COMMENTS AND EPA RESPONSES

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Introduction

Section 303(d) of the Clean Water Act (CWA) requires each state to identify waters for which existing pollution controls are insufficient for the affected waters to attain state water quality standards (WQS). States must also establish a priority ranking for waters, taking into account the severity of the pollution and the uses to be made of such waters, and develop total maximum daily loads (TMDLs) for these waters. A TMDL specifies the maximum amount of a pollutant that a water body can receive and still meet WQS, and allocates pollutant loadings among point and nonpoint pollutant sources.

Missouri's 2004/2006 submission included the 303(d) list of impaired waters, a description of the data and information the state considered, its methodology for identifying water bodies, public comments received by the Missouri Department of Natural Resources (MDNR) on the proposed list and the responses to those public comments. The Environmental Protection Agency (EPA) reviewed the state's submission to determine whether Missouri identified water bodies that should be included on the state's list and provided good cause for removing water bodies from the 303(d) list. As part of this review, EPA evaluated the existing and readily available data and information provided by MDNR and any additional information provided by the public during Missouri's public comment process to determine the adequacy of the state's response. EPA concluded that Missouri's 2004/2006 CWA Section 303(d) list did not include certain waters and pollutants that are required to be listed. Consequently, EPA sent a letter to MDNR on September 24, 2008, informing them of EPA's decision to partially approve and partially disapprove Missouri's 2004/2006 303(d) list.

At the same time, EPA identified additional water quality limited segments still requiring TMDLs in Missouri, as provided for in 40 CFR 130.7(d)(2). EPA issued a public notice on September 24, 2008, seeking written comments on EPA's proposed decisions to add waters and pollutants to Missouri's 2004/2006 303(d) list. EPA's proposed action was placed on the EPA Region 7 website and the full administrative record was available upon request. The public notice provided 60 days for the public to review the proposed decision and submit written comments.

EPA's September 24, 2008, public notice requested written comment on EPA's proposed decision to: (1) restore 49 water body/pollutant pairs to Missouri's 303(d) list, (2) add 86 water body/pollutant pairs to Missouri's 303(d) list, and (3) add additional segment length to certain waters included by Missouri on their 2004/2006 303(d) list. EPA received several comment letters. The types of comments received by EPA ranged from opinions to submissions of water quality-related data or information. This document contains the summaries of comments EPA received during the public comment period and EPA's responses to those comments. Because multiple individuals made similar comments, the responsiveness summary groups those comments accordingly and provides summary responses.

A few letters referenced comments that had previously been submitted to MDNR during the public notice(s) on its proposed 2004/2006 303(d) list. As noted above, EPA examined Missouri's public comment record during its review of the state's 2004/2006 303(d) list submission package to determine if the state adequately responded to comments, and whether or

not the state demonstrated good cause for not including on the list either water bodies or pollutants causing impairment. As such, EPA is not providing further response to these comments. However, in one instance (Crooked Creek), MDNR did not respond directly to the comment letter they received. EPA is including a response to this comment that was incorporated by reference in a letter submitted to EPA during the public notice on the proposed action.

Table 7 identifies those waters and/or pollutants of concern that EPA proposed adding/restoring to Missouri's list, but are not being added to the final list based on information provided by MDNR and/or the public during EPA's public comment period. Table 8 is the complete 2004/2006 Section 303(d) list, which includes final revisions to Table 11 (Consolidated 2004/2006 Missouri 303(d) List) from EPA's September 24, 2008, decision letter to MDNR.

Acronyms

The following is a list of acronyms used in this review document:

BOD	Biological (Biochemical) Oxygen Demand
CFR	Code of Federal Regulations
CTI	Community Tolerance Index
CWA	Clean Water Act
DO	Dissolved Oxygen
EPA	Environmental Protection Agency
FR	Federal Register
IBI	Index of Biotic Integrity
IRG	Integrated Report Guidance
MDC	Missouri Department of Conservation
MDNR	Missouri Department of Natural Resources
MSCI	Missouri Stream Condition Index
NVSS	Non-Volatile Suspended Solids
PIL	Permit In Lieu of a TMDL
RTAG	Regional Technical Advisory Group
TL	Trophic Level
TN	Total Nitrogen
TP	Total Phosphorus
TMDL	Total Maximum Daily Load
UAA	Use Attainability Analyses
USGS	United States Geological Survey
VSS	Volatile Suspended Solids
WBC	Whole Body Contact
WBID	Water Body Identification
WQS	Water Quality Standards
WWTP	Wastewater Treatment Plant

List of Commenters

Comments were received from the following individuals and entities:

1. Bollinger, Michael; Ameren
2. Brundage, Robert; Newman, Comley & Ruth
3. Christian, CW; Stream Team #2416
4. Ford, John; MDNR
5. Galbraith, Ed; MDNR
6. Hayes, Carl; Cherokee County Health Department, Kansas
7. Hoke, John; MDNR
8. Hughes, Roger and Sandy
9. Kruse, Charles E.; Missouri Farm Bureau Federation
10. Maynard, Barbara
11. Midkiff, Ken; Sierra Club
12. Miller, Bill
13. Morrison, Rob; MDNR
14. Myers, Susan M.; St. Louis Metropolitan Sewer District[1]
15. Santel, Buffy; St. Louis Metropolitan Sewer District
16. Schulte, Joe
17. Sherburne, Dan; Missouri Coalition for the Environment
18. Stober, Trent; MEC Water Resources, Inc.
19. Stover, Jeff
20. Swall, Donna; Lake of the Ozarks Watershed Alliance
21. White, Mark; Environmental Resources Coalition
22. Wilkins, David (via email from Brenda Ward); Kennett Board of Public Works
23. Wilks, Ruby

Listing of Classified Segment

In its proposed decision, EPA added the entire classified segment for several waters listed by Missouri. EPA received several comments expressing agreement and disagreement with this proposed decision. Several commenters cited specific water body/pollutant pairs for which they disagreed with the proposed decision (Table 1). EPA is responding to those comments collectively, below.

Table 1. List of water bodies on which people commented about EPA's addition of the entire segment length to the 303(d) list.

Water Body Name	**WBID**	**Pollutant**
Big River	2080	Cadmium
Big River	2080	Lead

[1] The comment letter from the St. Louis Metropolitan Sewer District (MSD) was received after the close of the public comment period, on November 25, 2008. As such, it is not part of the official record. EPA is listing it here to recognize the receipt of these comments on the proposed list. EPA is providing MDNR a copy of all the comments received during the public comment period so that they can be considered during the 2008 listing cycle.

Water Body Name	WBID	Pollutant
Big River	2080	Inorganic sediment
Big River	2080	Zinc
Center Creek	3203	Cadmium
Center Creek	3203	Lead
Douger Branch	3168	Cadmium
Douger Branch	3168	Lead
Eaton Branch	2166	Cadmium
Eaton Branch	2166	Lead
Eaton Branch	2166	Zinc
East Fork Locust Creek	608	Low DO
Flat River Creek	2168	Cadmium
Flat River Creek	2168	Lead
Flat River Creek	2168	Zinc
Flat River Creek	2168	Inorganic sediment
Mississippi River	1707	Lead
Mississippi River	1707	Zinc
Turkey Creek	3282	Cadmium
Turkey Creek	3282	Lead
Turkey Creek	3282	Zinc

In accordance with CWA Section 303(d), states are required to submit to EPA a list of "water quality limited segments." A "water quality limited segment" is defined as "any segment where it is known that water quality does not meet applicable water quality standards, and/or is not expected to meet applicable water quality standards, even after the application of the technology-based effluent limitations required by Sections 301(b) and 306 of the Act." (40 CFR 131.3(h)). Federal regulations at 40 CFR part 131 describe the requirements for states in establishing WQS, which include the designation of beneficial uses. Designated uses are defined as "those uses specified in water quality standards for each water body or segment whether or not they are being attained" (40 CFR 131.3(f)). States then adopt criteria to protect those uses. It is the evaluation of water quality data against the criteria that results in identifying water quality limited segments for the purpose of the 303(d) list. As such, it is essential that the 303(d) listed segments be easily comparable to the state's WQS.

EPA's *Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act*, known as the Integrated Report Guidance (IRG), discusses segmentation of waters for the purposes of assessment using the integrated report format. The guidance states:

> Use of the Integrated Report format and the use of the five-part categorization scheme envisions that each state provides a comprehensive description of the water quality standards attainment status of all segments within a state...

> Fundamental to this accounting is the use of a consistent and rational segmentation and geo-referencing approach for all segments including rivers, streams, lakes, wetlands, estuaries, and coastal waters. There is no single approach to the development of a segmentation scheme. However, it is important that the selected segmentation approach be consistent with the state's water quality standards and be capable of providing a spatial scale that is adequate to characterize the WQS attainment status of the segment.

In Missouri, water segments and the assigned designated uses are identified in the tables of classified lakes and streams in the state's EPA-approved WQS (10 CSR 20-7.031 Tables G and H). MDNR's *Final Guidelines for Water Body Classification* (March 2, 2005) provide guidance on selecting sites for determining stream classification. It specifies that "for all candidate streams, the portion of the evaluated segment…, should be representative of the entire segment with respect to stream morphometry, substrate and geology." This suggests that Missouri's classified waters are intended to be segments that display similar characteristics. It is these classified segments upon which the state relies for the implementation of other aspects of the WQS program, such as conducting use attainability analyses (UAAs) or developing draft site-specific criteria. In conducting a UAA or developing site-specific criteria, Missouri selects several sampling sites along the classified portion and uses the results of the sampling to evaluate the appropriate uses or criteria for the entire classified segment. The state assumes that those limited samples are representative of the entire classified segment. If sampling to evaluate the designated uses and criteria is extrapolated to the entire classified segment, then a consistent approach would be to also extrapolate sampling to assess attainment with those designated uses and criteria to the entire classified segment.

EPA does not disagree with the concept of subsegmenting a classified segment for purposes of the 303(d) list. However, in EPA's oversight role, it is important to be able to easily track changes from one listing cycle to the next so that other programmatic activities (e.g., developing TMDLs, issuing permits, distributing funding for restoration projects, implementing watershed restoration plans) are not halted due to a prolonged review. Missouri's approach satisfied some of the conditions contained in EPA's IRG by including GPS coordinates identifying the endpoints of the impaired portion. However, neither these coordinates nor the water body identification number (WBID) appear in Missouri's WQS, making it extremely difficult and time-consuming to independently verify the designated uses and associated criteria for each water body. Missouri's approach is not comparable to the state's WQS and is not consistent from year to year, which prevents tracking of specific impaired subsegments from one listing cycle to the next and inhibits timely review. Until such time as MDNR develops a comprehensive system for better defining the extent to which data is to be extrapolated for the purpose of assessing attainment with water quality criteria, EPA is relying upon the classified waters as described in the state's WQS for identifying waters on the 303(d) list.

Comments also noted that the segment endpoints used by EPA (township, range, and section) identify a square mile, which is unclear. EPA agrees and notes that this lack of clarity is a fundamental problem in the current method used to identify classified segments in Missouri's WQS. MDNR has explained on several occasions that they are working diligently to improve the classification system, and in recent years have made several updates to the segment lengths in

their WQS as a result of that effort. EPA supports MDNR's effort to update their WQS regulations. EPA chose to include the classified segment description to enhance the comparability and consistency of the 303(d) list to Missouri's WQS.

Listings for Bacteria

EPA proposed listing several waters as impaired by bacteria. EPA received several water body-specific comments, discussed below, and one general comment about EPA's analysis. In their comments, MDNR explained that they have taken steps to adopt a new criterion for Whole Body Contact (WBC) – Category B. They requested that EPA approve the new criterion and reassess those WBC-B waters against the new criterion. At this time, the revised criterion has not been submitted to EPA for review and approval. However, EPA is encouraged by the state's efforts and looks forward to resolving this issue in the 2008 listing cycle.

Fishpot Creek (2186) – Fishpot Creek is designated for WBC-B. EPA proposed listing Fishpot Creek as impaired by bacteria. In preparing the final decision on the list, EPA found an error in its original assessment of Fishpot Creek. In calculating the geometric mean for the 2001 recreation season, one sample from outside the recreation season (December 11, 2001) was accidentally included in the calculation. EPA revised its assessment and, as a result, is no longer including Fishpot Creek on the 2004/2006 list as impaired by bacteria. EPA recommends that MDNR schedule follow-up monitoring to gather an adequate dataset for determining the attainment status of the water.

North Fork Cuivre River (170) – This segment of the North Fork Cuivre River is designated for WBC-B. EPA proposed listing North Fork Cuivre River as impaired by bacteria based on its assessment of fecal coliform data. In their comments, MDNR asked if EPA was using the WBC – Category A fecal coliform criterion value (200 colonies per 100 milliliters (mL)) as a default value for WBC – Category B waters. In assessing fecal coliform data, EPA relied upon the only EPA-approved fecal coliform criterion for protection of waters that are designated for whole body contact recreation (200/100 mL) and found that it was not in attainment with that criterion. As such, EPA is including this water body on the list as impaired by bacteria.

Listings for Dissolved Oxygen

In its proposed decision on Missouri's 2004/2006 303(d) list, EPA proposed adding several waters as having an impaired aquatic life use as a result of low dissolved oxygen (DO). EPA received various comments in support and in disagreement with the proposed decision.

MDNR commented that they disagreed with EPA's proposed additions to the list for low DO in those cases where data suggests that the use is supported ***and*** the low DO is a result of natural conditions. MDNR requested that EPA review data for several biocriteria reference streams (Cedar Creek, East Fork Crooked River, Heaths Creek, and Little Drywood Creek), which they enclosed with their comment letter. The information sheets included land use/land cover information, continuous DO monitoring data, temperature, and some nutrient information. However, EPA did not propose listing any of these specific biocriteria reference stream segments

on the 2004/2006 303(d) list as impaired by low DO. One Class P segment of Little Drywood Creek, which is downstream of the Class C biocriteria reference stream segment, was proposed for listing. The information provided for the upstream Class C segment of Little Drywood Creek is not necessarily representative of the Class P segment. The Class P segment is downstream of the confluence of the outlet of Bushwacker Lake and land use/land cover information indicate the presence of other anthropogenic stressors (e.g., row crop and urban area) that could influence the ambient levels of DO instream (Figure 1). MDNR also provided a map with several monitoring locations and a summary of the DO data gathered at those locations. That map showed numerous sites with more than 100 samples taken over the past 30 years that had no violations of the DO criteria. While EPA's IRG discusses a specific exclusion for criteria violations that are a result of natural conditions, the data provided by MDNR does not conclusively demonstrate that the lower DO levels are a result of natural conditions.

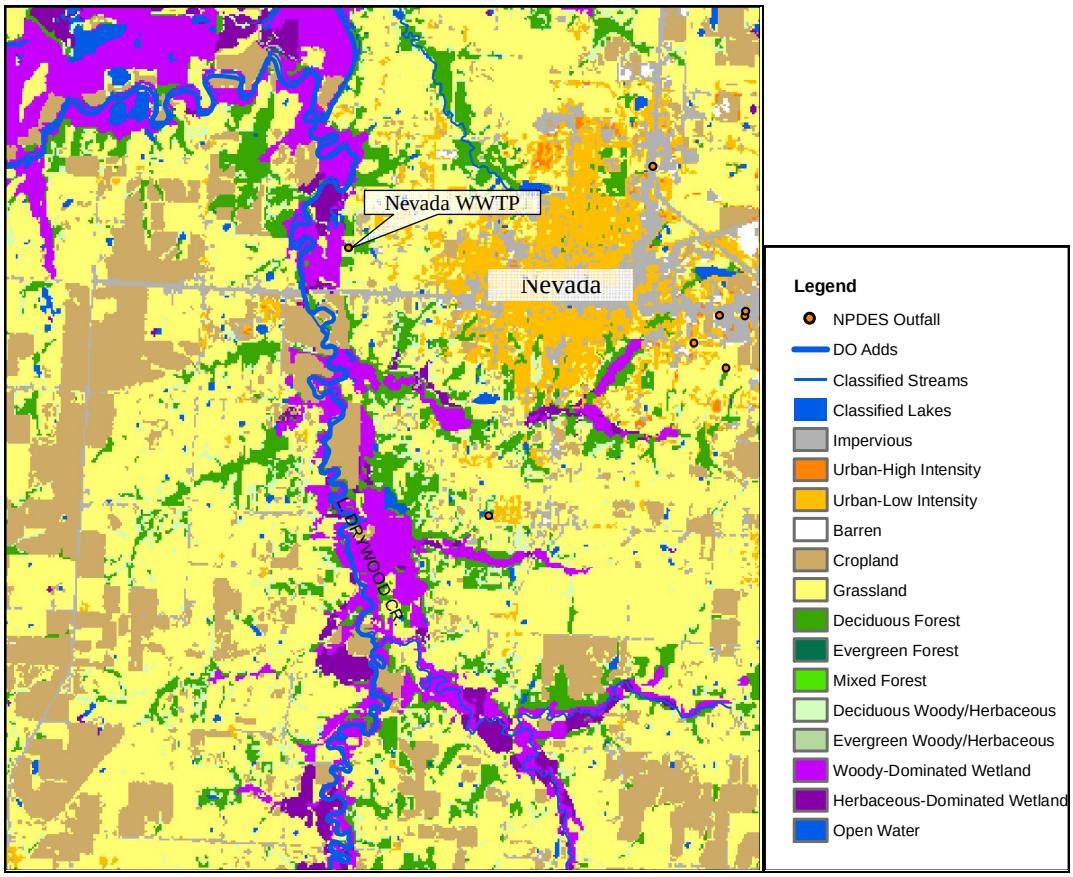

Figure 1. This graphic depicts the land use/land cover adjacent to the Class P segment of Little Drywood Creek, which EPA proposed for listing as impaired by low DO.

Several other comments also disagreed with EPA's decision to list waters as impaired by low DO in those cases where MDNR believes it to be a naturally occurring condition. One commenter expressed concern that EPA had not consulted MDNR on this issue to determine the basis of the state's recommendation. EPA and MDNR have been coordinating on the issues surrounding Missouri's DO criteria for several years. The commenter cites a news release about Missouri's draft 2008 list, where MDNR explains that some streams in the northern, western prairie and Bootheel regions of the state may have naturally occurring low DO. In looking at a

map with the approximate location of the streams added by EPA for low DO (Figure 2), one can see that Missouri's decision to not list waters for low DO is not limited to those regions where MDNR believes it is a natural condition. EPA also looked at the surrounding watersheds of several other streams it proposed for listing and found urban areas, row crop agriculture, and permitted wastewater discharges, which do not indicate a natural condition. At this time, MDNR has not presented the scientific data to support their contention that the low levels of DO are a result of natural conditions uninfluenced by anthropogenic sources.

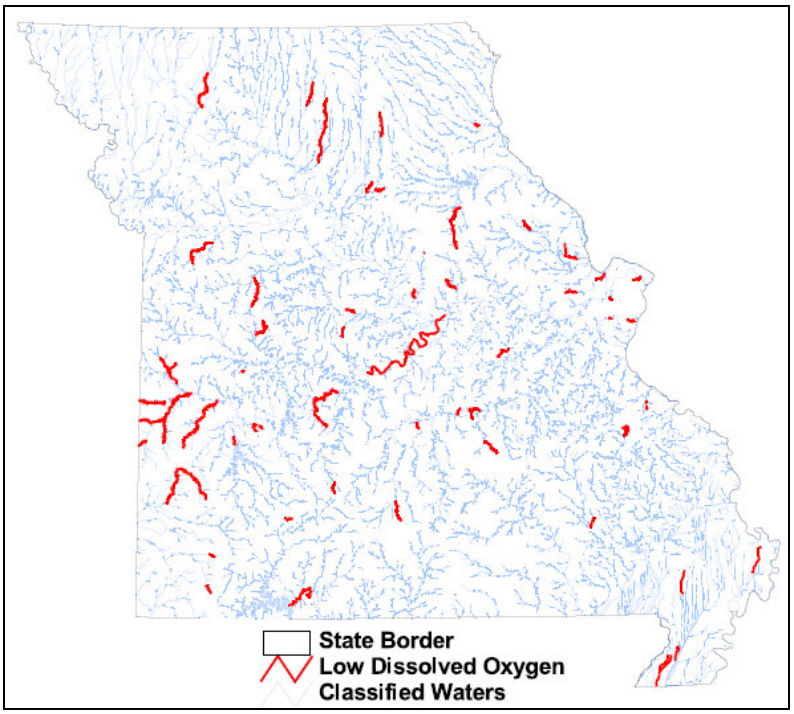

Figure 2. Water body segments EPA proposed to be added for low DO.

Missouri's WQS at 10 CSR 20-7.031(4)(J) state that "water contaminants shall not cause the dissolved oxygen to be lower than…" 5 mg/L for warm-water and cool-water fisheries and 6 mg/L for cold-water fisheries, or as indicated in paragraph (4)(A)(3)[2]. One comment disagreed with EPA's decision to use the binomial probability approach described in the *Statistical Procedures Used in the Preparation of the 2004 303(d) List* document submitted by MDNR for assessing attainment/impairment. Because EPA did not list waters with small sample sizes, the commenter assumed that this meant there needed to be multiple samples showing violation before establishing that the use is impaired. The commenter asserts that Missouri's WQS do not require or allow for multiple violations of the standard before the use is considered impaired and argues that a single violation of the criterion is an impairment of the use.

DO is a naturally variable parameter. Natural variability relates to the degree that conditions in nature vary as a function of time and space based on physical, chemical, biological, hydrological, and geomorphological factors. One would expect to observe concentrations of DO

[2] Paragraph (4)(A) states that "exceptions may be granted…(3) for the natural and unavoidable chemical and physical changes that occur in the hypolimnion of lakes. Streams below impoundments shall meet applicable specific criteria."

to rise and fall as the daily conditions, such as temperature and photosynthetic activity of plants, change throughout the day. Oxygen is delivered to surface water from overlying air and as a byproduct of photosynthetic activity of aquatic plants, which is further affected by sunlight and temperature. DO can also be affected by flow, stream channel or lake morphology, turbulence, biological activity, and decomposition of organic matter. The interplay among these factors results in DO conditions that can change in a water body based on the time of day, location of sample site, depth from which sample was taken, temperature, season, local weather conditions, and flow. This natural variability makes it difficult to evaluate datasets for samples that are aberrational, or unrepresentative of the ambient conditions. The language in Missouri's WQS specifically noting that "water contaminants" shall not be the cause of low DO indicates Missouri's understanding of the nature of this water quality parameter.

In addition to the naturally variable characteristic of DO, analysts also have to consider statistical variability. Statistical variability relates to accounting for sampling and analytical error and other factors that confer uncertainty in the accuracy, precision, and representativeness of sample data to represent the actual conditions of the water body. It is not uncommon for researchers to experience calibration problems with their DO samplers or observe "drift" in the reported data. Additionally, it is rare for states to have the technical capability and resources for continuous DO monitoring of all the waters they need to assess, and as such, analysts must rely on samples taken at infrequent intervals of time over a period of years to serve as the dataset for attainment decisions. Oftentimes water quality data is limited and analysts must draw conclusions based on small sample sizes. In this situation, there is a risk of identifying a water as impaired when the water is truly unimpaired (Type I error, or false positive) or identifying it as unimpaired when it is truly impaired (Type II error, or false negative).

For the natural and statistical reasons described above, a single sample may not be an accurate representation of the conditions of the water body. Missouri's listing methodology specifies that MDNR requires an approved Quality Assurance Project Plan for data to be considered for listing purposes, but sampling variability can still occur. EPA's *Guidelines for the Preparation of the Comprehensive State Water Quality Assessments (305(b) Reports) and Electronic Updates* (1997) and *Consolidated Assessment and Listing Methodology* (2000) guidance documents recommend making a non attainment decision for conventional pollutants[3] when more than 10 percent of measurements fail to meet the water quality criterion (commonly referred to as the "10 percent rule"). Many states implement the "10 percent rule" by using the binomial probability method, which is a tool for calculating and balancing the probability of drawing inaccurate determinations of impairment or attainment, for assessing water quality data. Rather than undertaking the labor-intensive effort and difficult task of checking each individual data point for this naturally variable parameter to be certain it is precise and accurately represents the conditions at the time of sampling, the use of the binomial probability method enables MDNR to quickly evaluate data, with the assumption that a certain proportion of the data (10 percent) may include unreliable measures.

Missouri's listing methodology cites EPA's IRG and recommended use of the "10 percent rule" for evaluating conventional pollutants, noting that the use of the "10 percent rule"

[3] Conventional pollutants are listed in Section 304(a)(4) of the Clean Water Act as including biological oxygen demanding (BOD) pollutants, suspended solids, fecal coliform, pH, and oil and grease.

must be in a manner consistent with the state's WQS. This indicates that Missouri's intent was to follow EPA's guidance to use the "10 percent rule" in a manner that is consistent with their state regulations. Specifically, Missouri's listing methodology discusses the use of the binomial test to determine if "no more than 10% of all samples do not meet criterion." The use of the phrase "10 percent of the samples," rather than "10 percent of the time" or "10 percent of the days," indicates that the use of the binomial probability method is as a statistical approach to ensure the data is sufficient for making attainment decisions and to provide increased assurance in the reliability of the final assessment, and that it is not intended to alter the underlying WQS. EPA's IRG notes that EPA does not consider assessment methods that merely describe the sufficiency or reliability of information necessary for states to make attainment decisions as having the effect of changing the ambient conditions considered necessary to support a designated use.

For all of these reasons, EPA believes that Missouri's choice of 10 percent is consistent with EPA's general recommendation for pollutant parameters of this type, the use of the binomial probability method represents a reasonable choice for this application with respect to naturally variable pollutant parameters like DO, and that the intent is to use this statistical test to ensure the data is reliable and representative, and provide statistical confidence in the results of the assessment. EPA does not believe that Missouri intends to revise the interpretation of their DO criteria. Waters that are not identified as impaired can reasonably be expected to achieve the intended level of protection established by Missouri's WQS. As such, EPA is not revising the methodology it used for assessing attainment with Missouri's DO criteria and making no revisions to its proposed decision based on the application of that methodology. Responses to water body-specific comments are below.

Clear Creek (3239) – Missouri identified 3 miles of Clear Creek (3239) as impaired by low DO on their 2004/2006 303(d) list. In its proposed decision, EPA included additional identifying information (classification, segment length, and legal description) for each water body in an effort to improve the transparency of the list to the public by providing locational information that is consistent with state regulations, and to improve the ability to track the progress of impaired waters from one listing cycle to the next. During its review, EPA found that Missouri's WQS do not contain a 3-mile segment of Clear Creek. MDNR explained (email from John Ford, November 16, 2007) that Table H lists the classified segment length for Clear Creek as 2 miles, when the correct length is 3 miles. Rather than revise the length of the segment identified by MDNR in its submission, EPA chose to retain the 3 miles, but for clarity and tracking purposes included a parenthetical reference to the 2-mile classified segment length. EPA still believes that this approach most clearly identifies the impaired segment while providing the public with additional information about the location in a manner that is consistent with the state's WQS. To make this clearer, EPA is adding a footnote to the table of listed waters explaining that the length in parentheses is the length according to Table H in Missouri's WQS.

Creve Coeur Creek (1703) – EPA proposed listing Creve Coeur Creek as impaired by low DO. MDNR commented that the data available do not indicate impairment. EPA evaluated the data submitted by MDNR using the z-statistic method described in Missouri's listing methodology for datasets containing more than 40 samples. The calculated *z* value was 1.44

with a *P* value of 0.075. This *P* value is less than the significance level (0.10) established in the listing methodology, resulting in a rejection of the null hypothesis and acceptance of the alternative hypothesis that the stream is impaired. EPA is not making changes to its proposed decision in response to this comment.

East Fork Locust Creek (608/3706) – MDNR commented that EPA had included the segment description for 2 classified segments of East Fork Locust Creek (WBID 608 and 3706). The old WBID 608 was subsegmented during the 2005 revisions of the WQS and a new WBID (3706) was assigned to the 3.6-mile segment that flows through Milan, MO. EPA has corrected the segment and legal description to identify WBID 3706. WBID 3706 is the segment that includes the portion of East Fork Locust Creek that MDNR identified as impaired in their 2004/2006 list submission and is downstream of the Milan Wastewater Treatment Plant (WWTP) discharge (Permit No. MO0048151), which MDNR identified as the source causing impairment in their 2004/2006 list submission.

EPA received one comment requesting that East Fork Locust Creek be removed from the 303(d) list. MDNR's 2004/2006 303(d) list submission included East Fork Locust Creek as impaired by low DO. EPA reviewed the record, found that it supported Missouri's decision to include it on the list as impaired, and as such, approved the listing in its September 24, 2008 list. The commenter noted that the character of the effluent from the City of Milan, which discharges into East Fork Locust Creek has significantly changed in recent years and the data used to assess East Fork Locust Creek is no longer representative. The commenter noted that discharge monitoring data would reflect the changes in the City's effluent. EPA reviewed the discharge monitoring data in the EPA Permit Compliance System (PCS) database.[4] There were no violations of the DO criterion at the monitoring site ¼-mile downstream of the discharge. The criteria violations from 2001 were collected at 1-mile and 2.5-miles downstream of the discharge. While the effluent quality may have improved in recent years, there are other sources in the watershed, including row crop agriculture and urban runoff, which may be impacting the DO in East Fork Locust Creek. In addition, the PCS data showed several violations of the permitted biological oxygen demand (BOD) limit, which can negatively affect ambient DO concentrations instream. The recent PCS data do not demonstrate that the depressions in the DO levels further downstream of the discharge are no longer a problem. EPA is not making revisions to its decision based on this comment, but will forward this concern to MDNR so that they can consider it while reviewing any newer water quality data for their 2008 list.

Fassnight Creek (3370) & Jordan Creek (3374) – EPA proposed listing Fassnight Creek for low DO based on data provided by MDNR in an assessment worksheet that identified the sample stream as Fassnight Creek. In their comment, MDNR asserts that the data is from Jordan Creek along Scenic Drive and that they intend to identify this segment as Jordan Creek in their 2008 submission. In reviewing the matter further, EPA found conflicting sources of information for the name of the creek that crosses Scenic Drive. According to geospatial data for Missouri's classified waters provided by MDNR, Jordan Creek flows into Fassnight Creek upstream of Scenic Drive and the stream retains the name Fassnight Creek. The (United States Geological Survey (USGS) National Hydrography Dataset identifies the stream below the

[4] EPA. Water Discharge Permit Compliance System database. Available online at: http://www.epa.gov/enviro/html/pcs/index.html

confluence of Fassnight Creek and Jordan Creek as Wilsons Creek, as do USGS topographic maps. However, the legal description of Jordan Creek in Table of H of Missouri's WQS appears to be consistent with MDNR's assertion in their public comment. As such, EPA is deferring to the state's interpretation of the segmentation and changing the listing of Fassnight Creek (3370) to Jordan Creek (3374).

Gravois Creek (1713) – EPA proposed listing Gravois Creek as impaired by low DO. MDNR commented that the data available do not indicate impairment. EPA evaluated the dataset submitted by MDNR, which included 35 samples from 1999 – 2004. Five of these 35 samples violated the DO criterion of 5 milligrams per liter (mg/L). Using the binomial probability method described in Missouri's listing methodology, this results in a rejection of the null hypothesis and acceptance of the alternative hypothesis that the stream is impaired. EPA is not making changes to its proposed decision in response to this comment.

In its proposed decision, EPA erroneously identified the segment length for the Gravois Creek/low DO listing as 5 miles. The final list includes the corrected length of 4 miles.

Lake of the Ozarks (7205) – EPA did not propose adding Lake of the Ozarks as impaired by low DO based on data gathered downstream of the discharge from Truman Dam. One commenter requested additional explanation about EPA's assessment of this particular water body. In its submission, Missouri included two sets of DO data for Lake of the Ozarks. One dataset included five samples gathered by the United States Army Corps of Engineers from 1999 – 2001. The second dataset included the minimum values from 8 days (August 22 – 29, 2006) of continuous sampling at two sites below Truman Dam. None of these minimum values violated the DO criterion, and as such, EPA did not propose listing the lake as impaired.

Osage River (1031) – EPA proposed adding this segment of the Osage River as impaired by low DO based on data gathered downstream of the discharge from Bagnell Dam. The comment expressed several concerns related to the proposed listing. While the comment stated that they were neutral with regards to EPA's decision to list the water body, they were concerned about the implications of EPA's assessment methods on future efforts to improve the quality of the lower Osage River. The comment stated the belief that EPA misinterpreted Missouri's DO criterion as an absolute minimum, which resulted in an overestimate of the percentage violation. EPA acknowledges that Missouri's WQS do not specifically identify the DO criteria as "acute criteria." However, Missouri's criteria do state that "water contaminants shall not cause the dissolved oxygen to be lower than [5 mg/L for warm-water and cool-water fisheries, and 6 mg/L for cold-water fisheries]" (10 CSR 20-7.031(4)(J). Furthermore, Missouri's criteria are based on EPA's recommended criteria for the protection of aquatic life, which is expressed as a 1-day minimum when early life stages are present. To assess DO data over a 96-hour chronic averaging period, as the comment suggests, would clearly be a misinterpretation of the science used to develop the criteria to protect aquatic life.[5]

The comment also called attention to the possibility that the dataset used by EPA to assess the Osage River may have contained duplicate data, or data gathered simultaneously by

[5] See *Ambient Water Quality Criteria for Dissolved Oxygen*, U.S. Environmental Protection Agency, EPA 440/5-86-003, April 1986.

two separate entities. EPA was not aware that this situation may have occurred. The dataset used by EPA was included in Missouri's submission and, unfortunately, did not include the level of detail that would have allowed EPA to determine which data points may have been duplicate entries. Should additional information be available for future listing cycles that would help eliminate this potential problem, EPA will certainly consider it. However, based on the analyses provided by the commenter, EPA does not believe that this would have changed the assessment results, and the Osage River would still have been identified as impaired.

The comment stated that the analysis used by EPA substantially overestimates the extent of the DO noncompliance on the Osage River. Federal regulations require states to submit a description of the methodologies used to develop their 303(d) list (40 CFR 130.7(b)(6)(i)). EPA considers this methodology in its review of the state's list, as it did when it evaluated the data submitted by MDNR to propose adding waters as impaired for low DO. While EPA understands the reason for the comment, for the purposes of the 303(d) list the Agency is concerned about assessing the overall condition of the water body and if the water quality is supporting the designated uses, rather than with determining the rate of compliance or noncompliance for specific facilities. However, based on the calculations presented in the comment letter, EPA does not believe that using a different approach would have changed the assessment results.

The comment also raises concerns about the representativeness of data used for assessment that was gathered during targeted seasonal monitoring. EPA understands and appreciates this concern. While some designated uses are seasonally applicable (e.g., whole body contact recreation from April 1 to October 31), the aquatic life designated use is applicable year-round. As such, a seasonal impairment is still considered an impairment of the designated use. When a TMDL is written to address an impairment, it considers critical conditions and seasonality. Identifying this segment as impaired based on targeted, seasonal monitoring is appropriate and protective of the designated use.

The comment noted that continuous monitoring data from 2005 were missing from EPA's evaluation. The Agency relies upon MDNR to provide the readily-available water quality data with the submission of their list. Any exclusion of data from EPA's analysis was unintentional. However, based on the calculations presented in the comment letter, EPA does not believe that the additional data would have changed the assessment results.

The comment indicated that the historical data may not be representative of future conditions because the facility is in the process of installing additional equipment to improve the DO conditions, which are not yet fully operational. As discussed in EPA's guidance, states may exclude data from evaluation if it is not representative of current conditions. See EPA's 2006 integrated report guidance (***Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act.*** July 29, 2005). This may be an appropriate consideration in future listing cycles, after the additional measures have been completed.

Finally, the comment expressed concern about the appropriateness of a TMDL for addressing DO on the Osage River. The language in EPA's letter describes the 303(d) list as a list of "water quality-limited segments still requiring TMDLs." This phrase is a direct quotation

from the federal regulations describing state requirements for submitting 303(d) lists (40 CFR 130.7(b)). EPA understands the commenter's belief that the TMDL process is not suited to address the impairment below Bagnell Dam and is willing to work with MDNR to evaluate whether placement in Category 4 might be appropriate, as suggested in the letter. Federal regulations do not require states to list waters that "other pollution control requirements (e.g., best management practices) required by local, State, or Federal authority" are stringent enough to implement applicable WQS. EPA's 2006 integrated report guidance describes EPA's expectations for demonstrating that "other pollution control requirements" are sufficiently stringent to achieve applicable WQS within a reasonable period of time. The guidance states:

> Specifically, this rationale should include: (1) a statement of the problem causing the impairment, (2) a description of the proposed implementation strategy and supporting pollution controls necessary to achieve water quality standards, including the identification of point and nonpoint source loadings that when implemented assure the attainment of all applicable water quality standards, (3) an estimate or projection of the time when water quality standards will be met, (4) a reasonable schedule for implementing the necessary pollution controls, (5) a description of, and schedule for, monitoring milestones for tracking and reporting progress to EPA on the implementation of the pollution controls, and (6) a commitment to revise as necessary the implementation strategy and corresponding pollution controls if progress towards meeting water quality standards is not being shown.

At this time, the readily-available water quality data indicates impairment on the Osage River and MDNR has not made a Category 4 demonstration to support their decision to exclude the river from the 303(d) list. As such, EPA is adding Osage River to the 2004/2006 list. However, Missouri is in the process of developing their 2008 303(d) list and EPA suggests continuing coordination to address this issue in the next listing cycle.

River des Peres and Sewer Branch (Unclassified Waters) – Missouri's WQS specify that unclassified waters are afforded protection by the General Criteria and acute criteria. In 2002, EPA added unclassified portions of Sewer Branch and River des Peres to Missouri's 303(d) list. EPA's rationale on the 2002 list was that the violations of the DO criteria demonstrated that the General Criteria in Missouri's WQS (10 CSR 20-7.031(3)) were not being met, which protect all waters of the state from toxic conditions. Following the decision on Missouri's 2002 list, EPA received a letter from MDNR (January 12, 2004 letter from Jim Hull to EPA Region 7) stating their belief that EPA's decision to apply the DO criteria to unclassified waters was a "significant misinterpretation" of state regulations, that the criteria are not considered acute criteria, and as such, would not apply to unclassified waters. As a result of this clarification on Missouri's interpretation of their WQS, EPA did not propose listing unclassified waters as impaired by low DO and approved the state's decision to not include unclassified portions of River des Peres and Sewer Branch in Category 5 on the 2004/2006 list. EPA received a comment in disagreement with this decision, citing EPA's decision on the 2002 list. As explained above, Missouri clarified the intent of their regulations with respect to DO and unclassified waters. While low DO levels can be "toxic" to aquatic life, Missouri's current DO criterion is not specifically to protect against acute conditions. EPA recognizes that Missouri is

working to address the universe of unclassified waters to ensure that the proper protection is afforded to them, but does not feel that individual listings of certain waters is the most effective approach and would be inconsistent with Missouri's interpretation of their regulations. EPA is not making changes to its proposed decision to delist these water body/pollutant pairs in response to the comment it received on this issue.

Roubidoux Creek (1512) – EPA proposed listing Roubidoux Creek as impaired by low DO. MDNR commented that the data available do not indicate impairment. In reviewing MDNR's assessment, EPA found that Missouri accidentally reviewed the data against the incorrect criterion. Roubidoux Creek is designated as a Cold Water Fishery, and as such, the dissolved oxygen criterion is 6 mg/L. The dataset contained 35 samples, 14 of which violated the criterion. Using the binomial probability method described in Missouri's listing methodology, this results in a rejection of the null hypothesis and acceptance of the alternative hypothesis that the stream is impaired. EPA is not making changes to its proposed decision in response to this comment.

Troublesome Creek (0073) – EPA proposed listing Troublesome Creek (0073) for low DO based on data provided by MDNR in an assessment worksheet that identified the sample stream as Troublesome Creek (0073). In their comment, MDNR states that the data is from a different classified segment of Troublesome Creek (0074). EPA reviewed the matter further and agrees with MDNR. The assessment sheet provided by MDNR did not provide a detailed description of the sample site location, but EPA was able to determine the USGS sample site number (USGS 05499900) and find locational information (http://nwis.waterdata.usgs.gov/nwis/qwdata/?site_no=05499900&amp) to confirm that the data is from WBID 0074. EPA appreciates this correction and made the appropriate changes to the final list to reflect the classified segment on which the data was gathered.

West Fork Niangua River (1175) – MDNR commented that the dataset used by EPA to add this water body to the list as impaired by DO only included 2 days of sampling. This dataset is adequate to indicate impairment according to Missouri's WQS and listing methodology. Two of the six samples violated the criterion. These two violations were detected in the early morning hours, when a stream is most likely to experience low levels of DO. EPA is not making changes to its decision in response to this comment.

West Yellow Creek (599) – EPA proposed listing West Yellow Creek (599) for low DO on Missouri's 2004/2006 303(d) list and included identifying information from Missouri's WQS in its proposed decision. MDNR commented the locational information that EPA included in the proposed list is incorrect. EPA appreciates MDNR taking the time to identify this error and provide the correct information. MDNR also commented that EPA's assessment is based on an insufficient dataset of only 2 days. The data provided by MDNR is adequate to indicate impairment according to Missouri's WQS and listing methodology. Four of the six samples collected violated the criterion. EPA is not making changes to its decision in response to this comment.

Wolf Creek, Tributary to (3589) – MDNR commented that the dataset used by EPA to add this water body to the list as impaired by DO only included 2 days of sampling. EPA

reviewed the assessment worksheet provided by MDNR for WBID 3589 and found that it also included data for WBID 3588, which EPA had accidentally included in its assessment for WBID 3589. In response to this comment, EPA reviewed the data again for WBID 3589 and found that there were only three samples, which is insufficient for assessing attainment. As a result, EPA is no longer adding WBID 3589 as impaired by low DO and recommends that MDNR conduct additional monitoring to determine the attainment status.

Listings for Inorganic Sediment

One commenter stated that EPA is prohibited from listing waters as impaired by inorganic sediment because Missouri's WQS do not have a criterion for inorganic sediment. While it is true that Missouri's standards do not contain a specific numeric criterion, the standards do contain narrative criteria that apply to all waters of the state. Those narrative criteria contain several conditions that Missouri could reasonably interpret to identify impairments caused by inorganic sediment. The General Criteria (10 CSR 20-7.031(3) state:

> No water contaminant, by itself or in combination with other substances, shall prevent the waters of the state from meeting the following conditions: (A) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses… (G) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community.

As described in EPA's 2003 draft *Developing Water Quality Criteria for Suspended and Bedded Sediments: Potential Approaches*, excessive sediments may present a significant ecosystem stressor. In streams, inorganic sediments can negatively impact aquatic habitat and, thereby affect macroinvertebrate communities and fish populations' spawning, rearing, and feeding behaviors. EPA supports the state's effort to implement its narrative criteria and include violations of the narrative criteria on its 303(d) list, as is required by federal regulations (40 CFR 130.7(b)(3)). MDNR provided data supporting the listings for inorganic sediment and, as the commenter noted, EPA approved those listings. EPA also disapproved the delisting of several water bodies for inorganic sediment[6] because the state did not provide good cause for their removal from the 303(d) list. EPA is making no changes to its proposed decision in response to this comment.

Indian Camp Creek (212) – EPA proposed restoring Indian Camp Creek to the 303(d) list as impaired by inorganic sediment. MDNR commented that it was not included in their list because the 2004 data indicated that the fine sediment deposition in the segment was less than the upstream control stream. During its initial review of Missouri's list, EPA reviewed the assessment worksheet provided by MDNR and requested additional information about the flow associated with the sediment data. In response, MDNR provided the study report

[6] As discussed in EPA's September 24, 2008 decision letter, MDNR changed the listed pollutant for several water bodies from NVSS to inorganic sediment. EPA approved this pollutant change and proposed restoring several waters that Missouri had delisted for NVSS as impaired by inorganic sediment to be consistent with the state's method of describing this impairment.

Characterization of Sediment Deposition – Indian Camp Creek, Warren County (March 9 and March 22-23, 2004. MDNR Environmental Services Program).

While the assessment worksheet accurately describes that the samples taken from Site 3 are upstream of JZ Landfill, it does not fully describe the conditions of this upstream reach. The 2004 report identifies multiple permitted point sources in the watershed upstream of the landfill, which include several mobile home parks and subdivisions, a Missouri Department of Transportation rest area, a concrete plant, a paper products company, and an animal food facility. Several of these point sources, in addition to nonpoint sources, could be contributing sediment to Indian Camp Creek. Furthermore, the 2004 report describes the upstream site as "represent[ing] impacts from [a] gravel mining area…" and as "flanked on both sides by row crops, with a riparian zone…" MDNR's analysis does not include an evaluation of the potential stressors upstream of the landfill on Indian Camp Creek. Additionally, no comparison was made to an unimpaired stream, and, as such, MDNR's assessment of the data provided by the 2004 report does not conclusively demonstrate that the observed sediment deposition in Indian Camp Creek is an unimpaired condition. MDNR has not provided good cause for delisting Indian Camp Creek. As such, EPA is not revising its proposed decision and is restoring Indian Camp Creek to Missouri's list as impaired by inorganic sediment.

Peruque Creek (217 & 218) – EPA proposed restoring two segments of Peruque Creek to the 303(d) list as impaired by inorganic sediment. In their comment, MDNR provided sediment deposition data and asked if EPA was aware of and considered this data. EPA was aware of the data and did consider it during their review of Missouri's submission. In their assessment, MDNR excluded data from the most impacted site, Ruge Park, claiming that it was not comparable to the selected reference stream due to its small size. Rather than excluding this data, which indicates impairment, MDNR could have selected a reference stream that is more comparable to the stream size at this site on Peruque Creek. In addition to the low invertebrate scores and high sediment deposition found at this site, the Missouri Department of Conservation (MDC) provided fish Index of Biotic Integrity (IBI) data. In her email, Sarah Kleusner, MDC, explains that one of the metrics used in the IBI showed a significant decrease in the benthic fish species at the Ruge Park site between 2001 and 2005. A public comment submitted to MDNR by Mike McKee, MDC, also discussed the high turbidity values that have been observed in the watershed as part of an ongoing monitoring study. Finally, there is a draft report written for EPA, *Stormwater Control Practices: Monitoring the Influence on Missouri's Urban Streams*, which documents additional disturbance and sedimentation in the watershed. The available data does not support MDNR's decision to delist Peruque Creek. As such, EPA proposed restoring Peruque Creek to Missouri's 303(d) list as impaired by inorganic sediment and is not making changes to its proposed decision in response to this comment.

Shaw Branch (2170) – EPA disapproved the delisting of Shaw Branch for inorganic sediment[7] and proposed restoring it to the 2004/2006 list. Missouri listed and EPA approved Shaw Branch as impaired by cadmium and lead in sediments. While the data supported the

[7] As explained in the September 24, 2008 decision document, in this listing cycle Missouri has chosen to change the pollutant for those water bodies that were previously identified as impaired by NVSS to inorganic sediment. For this reason, to be consistent with the state's method of describing this pollutant, EPA is identifying the pollutant as inorganic sediment rather than NVSS.

state's decision to identify these pollutants causing impairment, Missouri did not provide an explanation or data to demonstrate that inorganic sediment was no longer a pollutant causing impairment. As such, Missouri has not provided good cause to support the removal of inorganic sediment as a pollutant and EPA is restoring it to Missouri's 303(d) list.

Village Creek (2864) – Village Creek (2864) was listed in 1994 as impaired by inorganic sediment. In their submission, MDNR listed a downstream segment of Village Creek (2863), but did not include WBID 2864 on their 2004/2006 list. EPA proposed restoring Village Creek (2864) to the list as impaired by inorganic sediment. In their comments, MDNR explained that the original listing was an error and the data indicating impairment is on the downstream segment of Village Creek (2863). MDNR explained in their comments that the listing of WBID 2863 was intended to correct this original listing error. EPA reviewed the record and does not concur with MDNR's assessment of the data record. MDNR listed Village Creek in 1994 without a specific identification number. In the 1998 list, MDNR's list included WBID 2864 and identified the source as Mine La Motte tailings. MDNR's 1998 list submission and the TMDL information sheet for Village Creek (2864)[8] explain that MDNR listed this segment based on violations of the narrative criteria resulting from erosion of the mine tailings pile adjacent to this segment (WBID 2864) of Village Creek. In its submission, MDNR did not provide any data to suggest that the erosion from the tailings pile has been eliminated and that the narrative criteria are not longer being violated on this segment of Village Creek. As such, EPA is making no revisions to its proposed decision, and is restoring Village Creek (2864) to the 2004/2006 303(d) list.

Listings for Mercury

EPA proposed adding several waters to Missouri's 2004/2006 303(d) list as impaired by mercury. As described in the decision letter, EPA evaluated the data submitted by MDNR against EPA's recommended 304(a) criterion for methylmercury in fish tissue, which is also included in Missouri's listing methodology as a fish tissue threshold for identifying impairment. EPA received one comment suggesting that EPA's 304(a) criterion is not stringent enough for Missouri, based on site-specific data evaluated by MDNR in their memorandum describing their weight of evidence approach for the 2008 list.

EPA's recommended criterion of 0.3 milligrams per kilogram (mg/kg) is based on a fish consumption rate of 17.5 grams/day for the general public. The value of 17.5 grams uncooked fish per day is the 90th percentile of freshwater and estuarine fish consumed by the public according to the *1994–96 Continuing Survey of Food Intakes by Individuals* (USEPA 2000i). EPA uses this value as the default consumption rate in development of water quality criteria. It is comprised of default trophic level (TL) values for the general population, which are 3.8 grams/day for TL2, 8.0 grams/day for TL3, and 5.7 grams/day for TL4. States may choose to apply the recommended mercury criterion to only trophic level 4 or the highest trophic level consumed. This results in a conservative assumption, thereby protecting most, if not all, populations at a fish consumption rate of 17.5 grams/day. EPA's guidance on methylmercury also encourages states to adopt criteria using local and regional values where they believe an

[8] MDNR. Total Maximum Daily Load Information Sheet: Village Creek. December 2004. Available online at: http://www.dnr.mo.gov/env/wpp/tmdl/info/2864-village-ck-info.pdf

alternate criterion would be protective of target groups or populations. While it is EPA's preference that states use local data rather than the default values in establishing their criterion, it is not required. The information gathered by MDC is one such source of data that MDNR could evaluate to determine if an alternate criterion would be more appropriate. EPA's *Draft Guidance for Implementing the Methylmercury Water Quality Criterion* (August 2006; EPA 823-B-04-001) provides additional information on establishing criteria based on local data. At this time, EPA is not relying upon an alternate value for purposes of evaluating mercury fish tissue in Missouri, but encourages MDNR to look further into this issue.

One commenter disagreed with EPA's assessment and decision to approve the delisting of 10 water bodies from the list. The commenter asserted that in all cases there was no new data to support the delisting. While this is the case for certain waters where EPA's decision to approve the delisting was based on reassessing the existing data, in other cases more recent data indicated attainment with EPA's fish tissue criterion of 0.3 mg/kg. In their submission, Missouri submitted their fish tissue database to EPA, which contained more recent data from 2005. The table below (Table 2) summarizes some of the factors EPA considered in approving the decision to delist 10 waters as no longer impaired by mercury.

Table 2. Summary of EPA's assessment on water bodies it approved for delisting as no longer impaired by mercury.

Water Body Name	**WBID**	**Length (miles)/ Area (acres)**	**County**	**Assessment Comments**
Ben Branch Lake	7186	45	Osage	1 sample from 1987 >0.3mg/kg; 4 samples from 2002-2005 <0.3mg/kg
Bourbeuse River	2034	132	Franklin	5 samples collected 1998-2002; mean = 0.31mg/kg, *P*-value = 0.37, which is > 0.25 significance level.
Fellows Lake	7237	820	Greene	5 samples collected 1993-2002; mean = 0.31mg/kg, *P*-value = 0.415, which is > 0.25 significance level.
James River	2347	28	Stone	3 samples collected 1986-1987, 3 samples collected 2005; mean of all samples <0.3mg/kg and mean of more recent 2005 samples <0.3mg/kg
James River	2362	26	Stone	6 samples collected 1986-1987, 3 samples collected 2005; mean of all samples <0.3mg/kg and mean of more recent 2005 samples <0.3mg/kg
Lamine River	847	54	Cooper	4 samples collected 1999-2002; only 1 sample marginally above criterion with concentration of 0.301mg/kg; mean of all samples <0.3mg/kg
Longview Lake	7097	930	Jackson	5 samples collected 1987-2005; mean = 0.36mg/kg, *P*-value = 0.325, which is > 0.25 significance level.
Meramec River	1846	75	Franklin	Flaws in 2002 assessment; 4 samples collected 1998-2002, all samples <0.3mg/kg
Osage River	1031	82	Osage	1 sample collected 1979 <0.3mg/kg, 1 sample collected 1987 =0.35mg/kg, 3 samples collected 1998-2001 all <0.3mg/kg; mean of all samples <0.3mg/kg

Water Body Name	WBID	Length (miles)/ Area (acres)	County	Assessment Comments
Smithville Lake	7077	7190	Clay	2 samples collected 1987 <0.3mg/kg, 2 samples collected 1994-1997 >0.3mg/kg, 4 samples collected 2000-2005 all <0.3mg/kg; mean of all samples <0.3mg/kg

Lake St. Louis (7054) – EPA proposed listing Lake St. Louis as impaired by mercury. MDNR identified an error in EPA's assessment. One data point from 1998 was unintentionally excluded from the assessment. EPA reassessed the data for Lake St. Louis and concurs with MDNR's comment that the mean is less than the criterion value, and as such, does not indicate mercury impairment. EPA is revising its decision and no longer adding Lake St. Louis to the list as impaired by mercury.

Listings for Unknown Pollutants

One commenter stated that EPA is prohibited from listing waters as impaired by unknown pollutants because Missouri's WQS do not contain corresponding criteria and because these impairments may be caused by poor habitat rather than a specific pollutant. EPA's 2006 IRG discusses this concern:

> …if a designated use is not supported and the segment is impaired or threatened, the fact that a specific pollutant is not known does not provide the basis for excluding the segment from Category 5. These segments must be listed unless that state can demonstrate that no pollutant(s) causes or contributes to the impairment… If the assessment of the new data and information demonstrates that the use impairment is not associated with a pollutant and is attributable to other types of pollution (e.g., flow or habitat alteration) the segment may be placed into Category 4c.

In some instances, the impairment was identified by EPA during its review of the 2002 list and visual/benthic low flow surveys. The surveys indicated impaired biological communities and, in some instances, identified potential stressors (e.g., low dissolved oxygen, excessive algae, metals). MDNR did not provide good cause for delisting these segments nor did they make a Category 4C demonstration that the impairment is attributable to "pollution" rather than a specific pollutant. EPA is not making any changes to its proposed decision in response to this comment. The listing of waters based on violations of narrative criteria is further discussed in the "Unclassified Waters and Narrative Criteria Listings" section of this document. Please refer to that section for additional discussion on the use of numeric translators for making impairment decisions.

Bear Creek (115U) – EPA proposed restoring this unclassified stream to Missouri's 303(d) list. MDNR commented that there was no statistical difference between Bear Creek and the reference stream fish data. In 2002, EPA added this water body/pollutant pair to Missouri's list, explaining that the data indicate that the Kirksville WWTP is adversely impacting the fish community in Bear Creek. Upstream of the WWTP, there were nine species present, while

sampling downstream found only one fish species. This decrease in the number of species 0.2 miles downstream of the WWTP indicates that the conditions created by the discharge severely limit the diversity of fish species otherwise found upstream of the treatment plant. These biological data indicate a violation of Missouri's general criteria (10 CSR 20-7.031(3)) for this unclassified stream. MDNR has not provided any additional data indicating attainment or information suggesting that these original data are unrepresentative. As such, EPA is restoring this water body/pollutant pair to the list.

Dardenne Creek (221) – EPA proposed restoring Dardenne Creek to the list as impaired by unknown pollutants. MDNR commented that they believe that sediment is causing the impairment and, for discussion purposes, asked when EPA would feel it is reasonable to change a pollutant from "unknown" to a specific pollutant. In the case of Dardenne Creek, EPA evaluated the data used to identify the creek as impaired by unknown pollutants and compared that to the sediment data. There was one sample on WBID 221 indicating 100 percent fine sediment deposition, but this sample was gathered at the most upstream portion of the 15 mile segment near the Busch Conservation Area. EPA found that while the data supported Missouri's 2004/2006 listing of Dardenne Creek as impaired by sediment, it was not sufficient to conclusively determine if sediment is the cause of the low aquatic life scores for WBID 221. The data upon which the original "unknown" listing was based were gathered from three sites distributed more evenly throughout the segment, which appears to have other stressors that could affect aquatic life, such as urban runoff, channelization, low dissolved oxygen, or sewage problems. As such, EPA is restoring Dardenne Creek (WBID 221) as impaired by unknown pollutants to Missouri's 2004/2006 list.

Hickory Creek (588) – EPA disapproved the delisting of Hickory Creek and proposed restoring this to the 2004/2006 list. EPA added this water body to the 2002 list based on a visual/benthic low flow survey conducted by MDNR during spring of 2000, which noted increased algal growth. Subsequent to the submission of Missouri's final 2004/2006 list, MDNR submitted a *Biological Assessment and Channel Evaluation*[9] for Hickory Creek and requested EPA review this assessment in support of delisting the stream. The study included biological and water chemistry samples from three sites on Hickory Creek in the fall of 2006 and spring of 2007. In reviewing the information to support MDNR's proposed delisting, EPA considered the original reason for listing the stream as impaired, the data used to support the original listing, new data and/or information about the biological condition, water chemistry data, the appropriateness of the reference streams, and other observations taken in the field. EPA also considered EPA's recommended criteria for streams in Ecoregion IX (Level III, Ecoregion 40)[10] and the benchmark nutrient values developed by the Region 7 Technical Advisory Group (RTAG). The RTAG consists of scientists from universities, state government agencies, and

[9] MDNR. 2007. *Biological Assessment and Channel Evaluation, Hickory Creek and Hickory Creek Tributary, Grundy County, Missouri*. Fall 2006 - Spring 2007.

[10] EPA. 2000. Ambient Water Quality Criteria Recommendations – Rivers and Streams in Nutrient Ecoregion IX. EPA-822-B-00-019. U.S. Environmental Protection Agency – Office of Water. December 2000. Available online: http://www.epa.gov/waterscience/criteria/nutrient/ecoregions/rivers/rivers_9.pdf.

federal government agencies. In an effort to support the development of stream nutrient criteria in Region 7, the RTAG developed scientifically defensible nutrient benchmarks.[11]

The 2000 visual/benthic survey was conducted in the spring. Sampling for the ***Biological Assessment*** occurred in the fall of 2006 and spring of 2007. The original listing was based on the presence of algae in the spring. Unlike 2000, there was no mention of benthic algae in the stream substrate descriptions during the 2007 spring sampling. This indicates that algal growth is no longer causing violations of the narrative criteria on Hickory Creek. The water chemistry data provides EPA a method for further evaluating the stream condition by comparing the numeric data to nutrient levels expected to maintain the beneficial use. Two of the three fall 2006 total phosphorus (TP) concentrations (see Table 3) were greater than EPA's recommended criteria for streams in Ecoregion IX (Level III, Ecoregion 40) and greater than the benchmark value developed by the RTAG. However, all four spring samples were below the Ecoregion IX recommendation and only one sample was slightly elevated (TP = 0.08 mg/L) above the RTAG benchmark. Total nitrogen (TN) concentrations were all below the criteria recommendation and the RTAG benchmark (Table 3).

While there were several exceedances of the TP and TN benchmark values during the fall, there were no qualitative observations indicating these concentrations resulted in problematic algal growth. The fall 2006 nutrient data are not conclusive in determining if conditions persist that may lead to excess algal growth as was noted in 2000. During the spring 2007 sampling, there was no qualitative observation of algal growth and the nutrient concentrations indicate that ambient water quality would not lead to excess algal growth, as was noted in the 2000 spring survey.

Table 3. Nutrient data for Hickory Creek. The recommended criteria values are from EPA Ecoregion IX, Level III, Ecoregion 40 and the RTAG benchmarks developed for Region 7. One asterisk (*) indicates exceedance of one benchmark. Two asterisks (**) indicates exceedance of both benchmark values.

	Total Phosphorus (mg/L)	**Total Nitrogen (mg/L)**
EPA Ecoregion IX Criteria	*0.0925*	*0.712*
RTAG Benchmark	*0.075*	*0.9*
Site 1 – Fall	0.07	0.32
Site 2 – Fall	0.28**	0.64
Site 3 – Fall	0.15**	0.56
Site 1a – Spring	0.07	0.37
Site 1b – Spring	0.08*	0.36
Site 2 – Spring	0.06	0.39
Site 3 – Spring	0.04	0.41

[11] Huggins, Donald G., Walter K. Dodds, Debbie Baker and Gary Welker. 2008 Draft Manuscript. Nutrient Reference Condition Identification and Ambient Water Quality Criteria Development Process - Rivers and Streams within EPA Region 7. University of Kansas. May 2008.

The Missouri Stream Condition Index (MSCI) is a four-part biological metric used to evaluate the aquatic macroinvertebrate community of a stream and compare it to reference conditions. MDNR's *Biological Criteria for Wadeable/Perennial Streams of Missouri*[12] document describes the derivation and interpretation of the MSCI. MDNR considers streams with MSCI scores from 16-20 to be fully supporting the aquatic life use. For Hickory Creek, MDNR calculated MSCI scores that ranged from 16-20 for all sites sampled. EPA evaluated the information provided about the dominant tolerant taxa present in Hickory Creek and found that pollution tolerant species comprised a similar percentage of the community (52-54 percent) as in the reference streams West Fork Big Creek and East Fork Grand River (43-52 percent) during the fall sampling season for which comparable data were available for both reference sites (Figure 3).

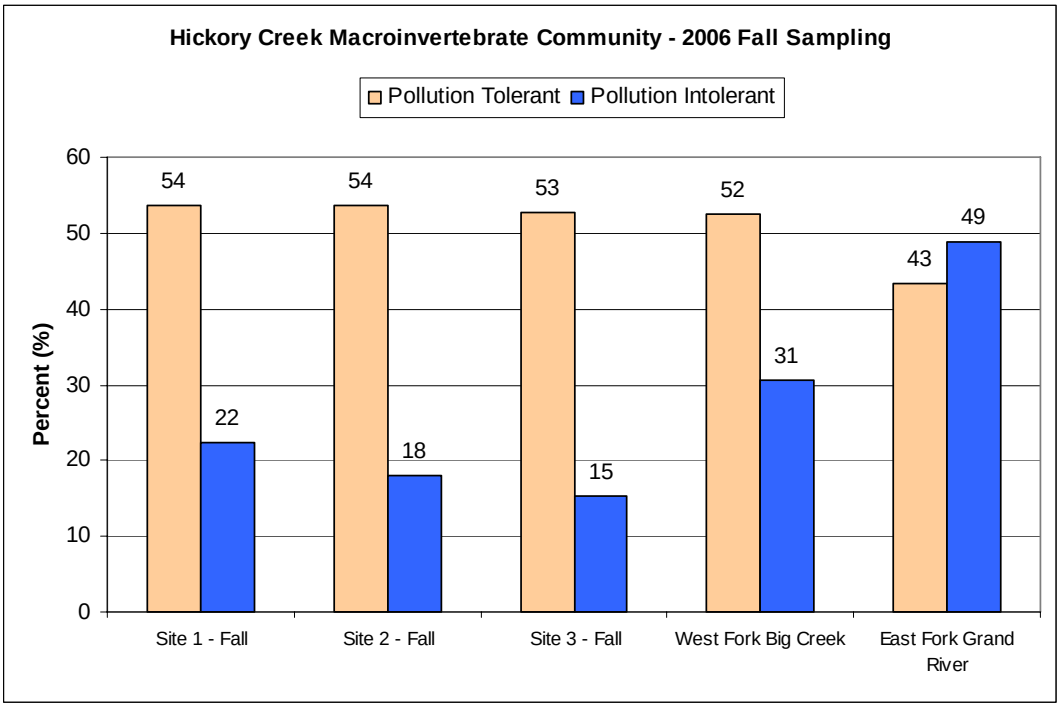

Figure 3. Chart illustrating the percentage of pollution tolerant and pollution intolerant species present in Hickory Branch and two reference sites.

Given that (1) excessive algal growth was not observed in recent monitoring, (2) the quantitative nutrient information indicates spring ambient conditions that would not lead to excessive algal growth, and (3) the data indicates that the biological community in Hickory Creek is similar to MDNR's reference conditions, EPA does not believe there is sufficient information indicating that excessive algal growth is causing impairment on Hickory Creek. MDNR has provided good cause to support delisting and EPA is approving the delisting of Hickory Creek for unknown pollutants.

[12] Sarver, R., S. Harlan, C. Rabeni, and S. Sowa. 2002. *Biological Criteria for Wadeable/Perennial Streams of Missouri*. MDNR. February 2002.

While EPA is approving the delisting of this water body/pollutant pair, EPA recommends that MDNR continue to monitor the conditions of Hickory Creek. There were several observations that warrant additional investigation, including fine sediment deposition.

Long Branch (602) – EPA disapproved the delisting of Long Branch and proposed restoring this to the 2004/2006 list. EPA added this water body to the 2002 list based on a visual/benthic low flow survey conducted by MDNR on July 17, 2000. During the review of the 2002 list, EPA calculated a Community Tolerance Index (CTI) to assess the biological information provided in the survey. The purpose of the CTI is to assign a numeric value to each species present based on its pollution tolerance. The most sensitive species were assigned a value of 1 and the most tolerant species were assigned a value of 10. If the average score for all species found at a site was greater than a CTI score of 6.5, the site was rated as impaired. In 2000 two of the calculated CTIs for Long Branch were 6.75 and 7.5. The 2000 survey noted the presence of anoxic sediments, which EPA reasoned was a violation of the state's narrative criteria at 10 CSR 20-7.031(3).

Subsequent to the submission of their final 2004/2006 list, MDNR submitted ***Stressor Identification for Long Branch, Linn County, Missouri***,[13] and requested that EPA review this assessment in support of delisting the stream. The study included biological and water chemistry samples from four sites on Long Branch in the fall of 2006 and the following spring and fall seasons of 2007. In reviewing the information to support MDNR's proposed delisting, EPA considered the original reason for listing the stream as impaired, the data used to support the original listing, new data and/or information about the biological condition, water chemistry data, the appropriateness of the reference streams, and other observations taken in the field.

For Long Branch, MDNR's MSCI scores were all greater than 16 with one exception where the score was 14. The assessment worksheet provided by MDNR when they submitted the ***Stressor Identification*** study explains that reference streams in the same Ecological Drainage Unit (EDU) score 16 or higher in 79.5 percent of the samples. Long Branch scored 16 or higher in eight of nine samples (88.9 percent). According to MDNR and their ***Biological Criteria*** document,[12] the scores for Long Branch indicate that the stream is similar to reference conditions and fully supporting the aquatic life use. EPA evaluated the data provided about the dominant tolerant taxa present in Long Branch. In three of four sites, pollution tolerant species comprised a smaller percentage of the community (25-30 percent) than in the reference streams West Fork Big Creek and East Fork Grand River (43-52 percent) during the fall sampling season for which comparable data were available for both reference sites (Figure 4).

[13] Roth, N., B. Morgan, and B. Franks. 2008. Prepared by Versar, Inc. for EPA – Region 7 as part of a larger report, *Stressor Identification for Willow Branch, Long Branch, Hickory Creek & Indian Creek, Missouri*.

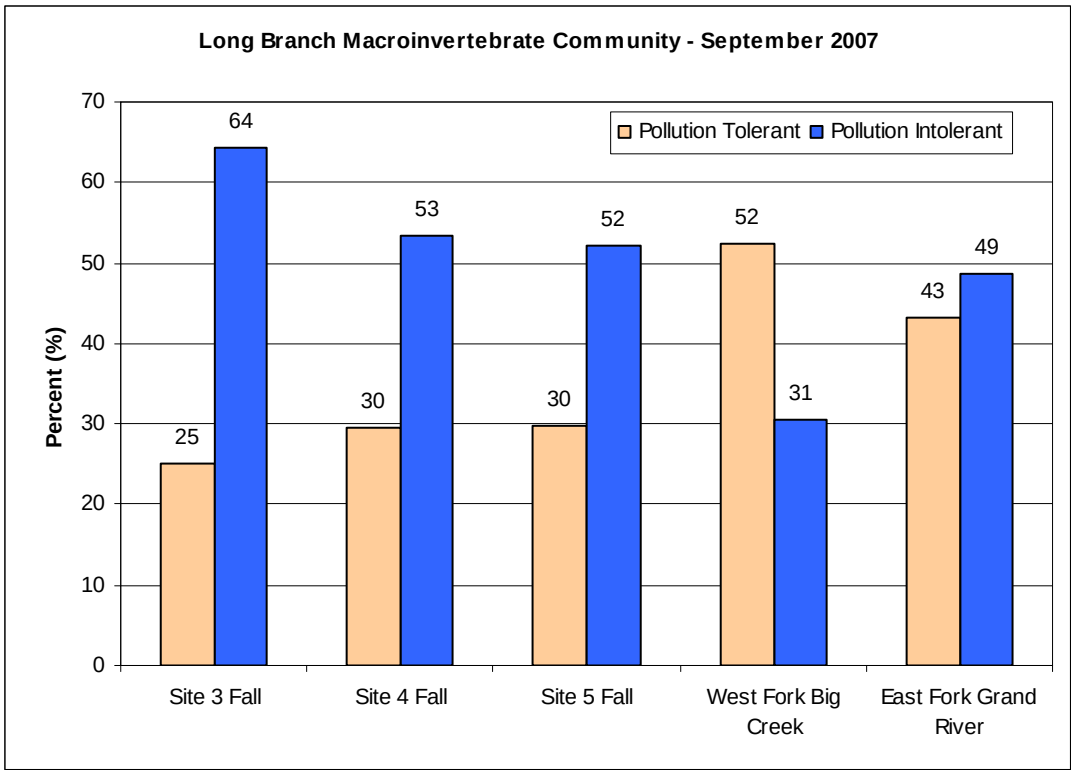

Figure 4. Chart illustrating the percentage of pollution tolerant and pollution intolerant species present in Long Branch and two reference sites.

In addition, the study included water chemistry data indicating elevated levels of nutrients and possibly low levels of DO. Qualitative observations noted minor amounts of algae and fine sediment deposition at several places along Long Branch. At this time, these data and observations are not sufficient to determine if these conditions are causing impairment, but indicate that further investigation is warranted.

The biological information provided by MDNR indicates that the aquatic life use is supported in Long Branch. As such, MDNR has provided good cause for delisting and EPA is approving the delisting of Long Branch for unknown pollutants. However, EPA recommends that MDNR continue to monitor the conditions of Long Branch to ensure that pollution intolerant species, such as mayflies, continue to persist in the stream and to determine if DO, nutrients, or sediment are violating numeric or narrative criteria.

Muddy Creek (557) – EPA disapproved the delisting of Muddy Creek and proposed restoring this to the 2004/2006 list. EPA added this water body to the 2002 list based on a visual/benthic low flow survey conducted by MDNR on August 3-4, 2000. The survey documented 2- to 12-inch strands of filamentous algae floating in the water and covering 25-75 percent of the substrate (mud and stone), noted reduced biodiversity, and stated that "the water was slightly green, which could indicate increased nutrients."[14]

[14] EPA Region 7. 2003. Administrative record for final decision on Missouri's 2002 303(d) list.

Subsequent to the submission of their final 2004/2006 list, MDNR submitted ***Biological Assessment and Channel Evaluation***[15] for Muddy Creek and requested that EPA review this assessment in support of delisting the stream. The study included biological and water chemistry samples from five sites on Muddy Creek in the fall of 2006 and spring of 2007. One site, downstream of the Trenton WWTP, was not resampled in the spring. In reviewing the information to support MDNR's proposed delisting, EPA considered the original reason for listing the stream as impaired, the data used to support the original listing, new data and/or information about the biological condition, water chemistry data, the appropriateness of the reference streams, and other observations taken in the field.

For Muddy Creek, MDNR's MSCI scores were all greater than 16 with one exception where the score was 14. The assessment worksheet provided by MDNR with the ***Biological Assessment*** explains that reference streams in the same EDU score 16 or higher in 79.5 percent of the samples. Muddy Creek scored 16 or higher in eight of nine samples (88.9 percent). According to MDNR and their ***Biological Criteria*** document,[12] the scores for Muddy Creek indicate the stream is similar to reference conditions and fully supports the aquatic life use. EPA evaluated the data provided about the dominant tolerant taxa present in Muddy Creek. EPA found four out of five sites where pollution tolerant species comprised a smaller percentage of the community (32-44 percent) than in the reference streams West Fork Big Creek and East Fork Grand River (43-52 percent) during the fall sampling season for which comparable data were available for both reference sites. However, the one site that did not have a similar percentage of pollution tolerant organisms was downstream of the Trenton WWTP. This site had 82 percent pollution tolerant species, indicating a localized impairment of the aquatic community in the vicinity of Trenton (Figure 5). Unfortunately, the site downstream of Trenton was not resampled during the spring, thus limiting further comparison of the impact of the discharge on the macroinvertebrate community.

[15] MDNR. 2007. ***Biological Assessment and Habitat Study Report, Muddy Creek, Grundy and Mercer Counties, Missouri***. September 2006 - March 2007.

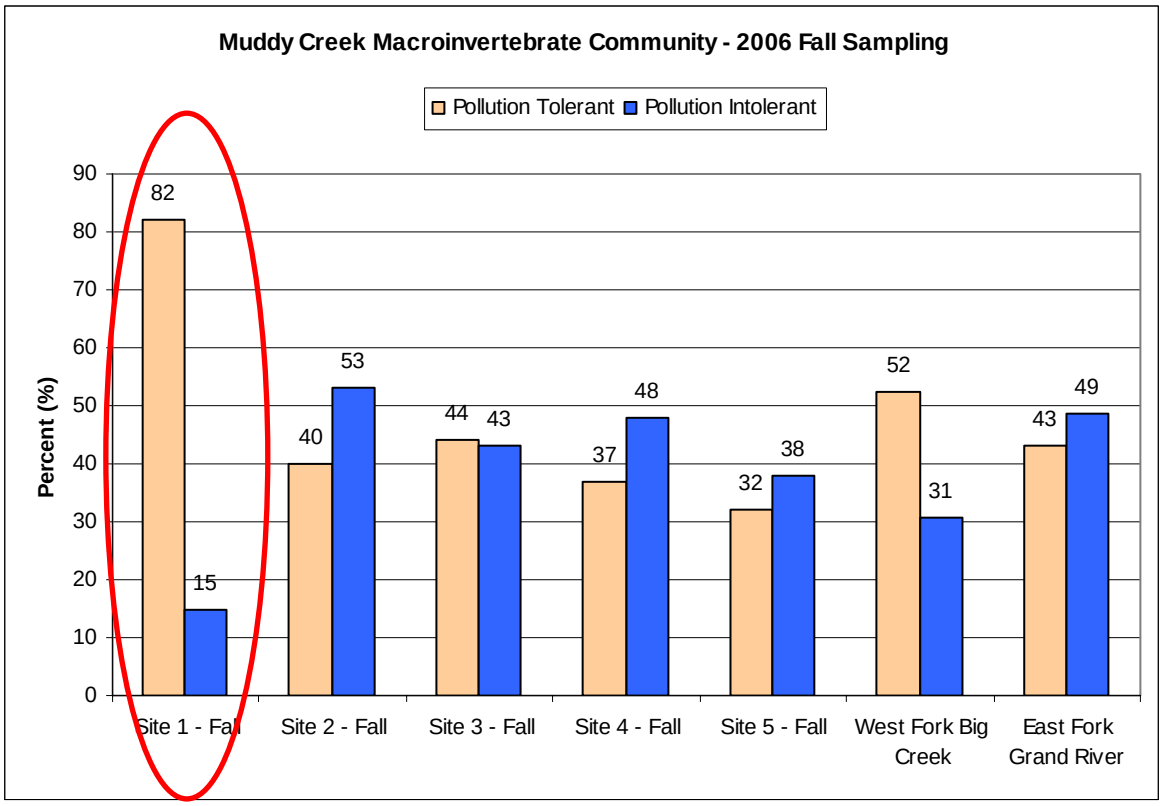

Figure 5. Chart illustrating the percentage of pollution tolerant and pollution intolerant species present in Muddy Creek and two reference sites.

The *Biological Assessment* report did not note algal growth at the time of sampling. This information is not particularly informative because the 2006-2007 sampling was conducted in the spring and fall seasons, and as such, may not have been able to detect any changes in the summer algal conditions that were observed in August 2000. The more recent sampling does not evaluate summer algal conditions and does not provide enough information to determine if excessive algal growth is no longer causing impairment. The water chemistry data provide EPA a method for evaluating numeric information and comparing that to levels of nutrients expected to maintain the beneficial use (see Table 4). In the fall sampling, only the site immediately downstream of the Trenton WWTP indicated water quality conditions that could lead to excess algal growth. At this location, the TP concentration (0.56 mg/L) was six times greater than EPA's recommended criteria for streams in Ecoregion IX (Level III, Ecoregion 40)[10] and seven times greater than the RTAG benchmark value.[11] This site also showed elevated concentrations of total nitrogen. All the other sites upstream of Trenton were below the recommended concentrations, which further indicates a localized impact in the stream reach downstream of Trenton. In the spring sampling, three of four sites exceeded the Ecoregion recommendation and all four sites exceeded the RTAG benchmark. The numeric water quality data indicates conditions that could lead to increased algal growth (Table 4).

Table 4. Nutrient data for Muddy Creek. The recommended criteria values are from EPA Ecoregion IX, Level III, Ecoregion 40 and the RTAG benchmarks developed for Region 7. One asterisk (*) indicates exceedance of one benchmark. Two asterisks (**) indicates exceedance of both benchmark values.

	Total Phosphorus (mg/L)	**Total Nitrogen (mg/L)**
EPA Ecoregion IX Criteria	*0.0925*	*0.712*
RTAG Benchmark	*0.075*	*0.9*
Site 1 – Fall	0.56**	0.99**
Site 2 – Fall	0.06	0.29
Site 3 – Fall	0.04	0.31
Site 4 – Fall	0.03	0.29
Site 5 – Fall	0.03	0.36
Site 1 – Spring	---	---
Site 2 – Spring	0.17**	0.86
Site 3 – Spring	0.14**	0.70
Site 4 – Spring	0.11**	0.76*
Site 5 – Spring	0.08*	0.65

For all the reasons described above, EPA does not believe that the recent data submitted by MDNR is good cause for delisting this stream. Muddy Creek was listed based on the presence of a pollution-tolerant community and algal growth. While the new information indicates that some portions of Muddy Creek are similar to reference conditions and are not dominated by pollution tolerant species, there is a significant difference in the biology of the aquatic community downstream of the Trenton WWTP. In addition, the nutrient data indicate conditions persist that could lead to excess algal growth. The study also noted that sediment may be impacting the aquatic community. This information may be helpful to MDNR in identifying the pollutant(s) causing impairment in Muddy Creek. EPA is not making changes to its decision in response to this comment, and is restoring Muddy Creek to the 2004/2006 list as impaired by unknown pollutants.

Sewer Branch (860 & 860U) – MDNR requested that EPA reevaluate the basis for the 2002 listing of Sewer Branch as impaired by unknown pollutants. On page 15 of EPA's *Responsiveness Summary to Public Comment: EPA Public Notice Regarding Changes to Missouri's 2002 Section 303(d) List* (December 2003) EPA explains that it listed Sewer Branch as impaired by unknown pollutants because the low levels of DO indicated a violation of the narrative criteria to protect aquatic life. EPA reevaluated the DO data and found the classified segment (860) was not impaired based on the data gathered in 2000-2002, and approved the delisting of the unclassified portion of Sewer Branch for low DO (see September 24, 2008 decision document and the Listings for Dissolved Oxygen section of this document). The data supporting the 2002 decision also included a 2000 visual/benthic survey on the unclassified portion of Sewer Branch. The survey notes that this section of the stream only carries flow during and immediately following rainfall events, and no aquatic macroinvertebrates were found on this section. In its response to comments on the 2002 list, EPA acknowledged that the lack of aquatic life in this unclassified portion was not necessarily an indication of the water quality

problem. There is no information about the aquatic community on the classified portion of Sewer Branch.

Federal regulations require that, upon request, the state provide good cause for not including a water body on the list (40 CFR 130.7(b)(6)(iv)), which could include identifying flaws in the original analysis of data and information. In this case, the original analysis included the application of the DO criteria to the unclassified portion of Sewer Branch. Because of the clarification provided by Missouri about the application of the DO criteria, there is no longer information indicating impairment on the unclassified segment of Sewer Branch. For the classified portion of Sewer Branch, the DO data indicates attainment and there is no aquatic information available to indicate impairment by unknown pollutants. As such, in response to this comment, EPA is approving the delisting of both the classified and unclassified portions of Sewer Branch for unknown pollutants. EPA continues to support MDNR's effort to address unclassified waters.

Willow Branch (0654U) – EPA disapproved the delisting of Willow Branch and proposed restoring this to the 2004/2006 list. EPA added this water body to the 2002 list based on a visual/benthic low flow survey conducted by MDNR on July 17, 2000. During the review of the 2002 list, EPA calculated a CTI to assess the biological information provided in the survey. The purpose of the CTI is to assign a numeric value to each species present based on its pollution tolerance. If the average score for all the species found at a site was greater than a CTI score of 6.5, the site was rated as impaired. The calculated CTI for Willow Branch was 7.1 in 2000. The survey also noted significant algal growth (25-75 percent cover of epipelic filamentous algae), which further indicated an impaired condition.

Subsequent to the submission of their final 2004/2006 list, MDNR submitted ***Stressor Identification for Willow Branch, Putnam County, Missouri***,[16] and requested EPA review this assessment in support of delisting the stream. The study included biological and water chemistry samples taken from one site on Willow Branch in the fall of 2006, spring of 2007, and fall of 2007. In reviewing the information to support MDNR's proposed delisting, EPA considered the original reason for listing the stream as impaired, the data used to support the original listing, new data and/or information about the biological condition, water chemistry data, the appropriateness of the reference streams, and other observations taken in the field.

For Willow Branch, MDNR calculated that the MSCI scores were 16, 18, and 16 for the fall 2006, spring 2007, and fall 2007 sampling events, respectively. These scores, according to MDNR and their ***Biological Criteria*** document,[12] indicate the stream is similar to reference conditions and fully supporting the aquatic life use. However, after reviewing the detailed sampling data of species present in Willow Branch, EPA found the data do not indicate conditions have improved since the 2002 listing of this stream as impaired. EPA compared the percentage of pollution tolerant species to the percentage of pollution intolerant organisms during the fall sampling season for which comparable data were available for both reference sites. EPA found that the aquatic macroinvertebrate community in Willow Branch was comprised of 91 percent pollution tolerant species, whereas the reference streams were between

[16] Roth, N., B. Morgan, and B. Franks. 2008. Prepared by Versar, Inc. for EPA – Region 7 as part of larger report, *Stressor Identification for Willow Branch, Long Branch, Hickory Creek & Indian Creek, Missouri*.

43-52 percent pollution tolerant species (Figure 6). The corresponding CTIs for the 2006-2007 survey were 6.5, and 7.1, which are similar to the CTI for the 2000 data (7.1). These indicate continued impairment.

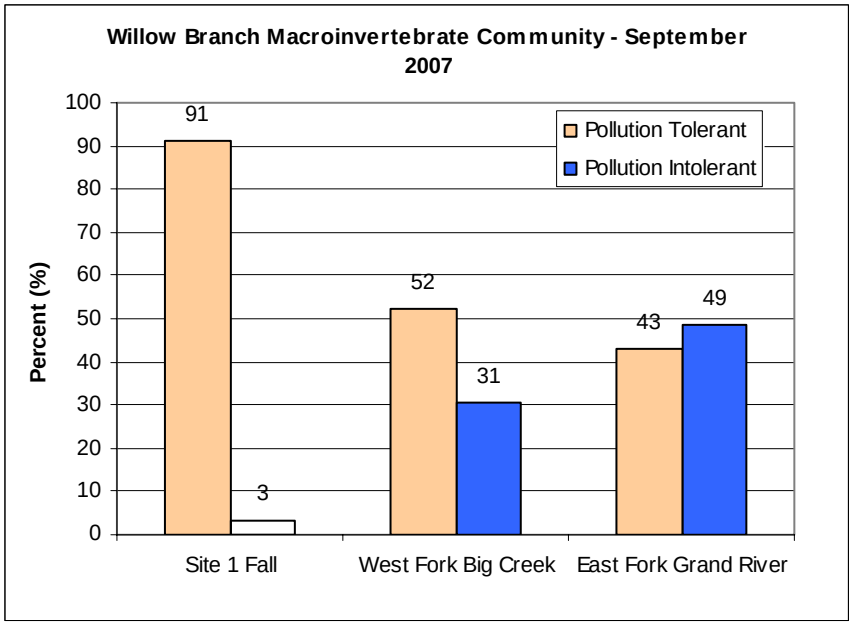

Figure 6. Chart illustrating the percentage of pollution tolerant and pollution intolerant species present in Willow Branch and two reference sites.

It may not be appropriate to compare Willow Branch, which is an unclassified stream, to the biological communities of Class C and Class P reference sites. According to Missouri's *Biological Criteria* document, one step in selecting a candidate reference stream is to evaluate the stream size. It states that "watershed areas and discharges of impacted and reference sites should differ by less than an order of magnitude." In the case of Willow Branch, the discharge was less than 0.1 cubic feet per second (cfs), which is more than an order of magnitude of difference between Willow Branch and reference sites in the same EDU during the fall sampling season for which comparable data were available for both reference sites (East Fork Grand River discharge 7.58 – 104 cfs, West Fork Big Creek discharge = 1.5 cfs).

Significant algal growth was also cited as indicating impairment in the 2002 listing of Willow Branch. The 2008 *Stressor Identification* report noted that algal growth covered less than 25 percent of the substrate at the time of sampling. This information is not particularly informative because sampling was conducted in the spring and fall seasons, and as such, would have been unable to detect any changes in the summer algal conditions that were observed in July 2000. Since the sampling did not evaluate summer algal conditions, the water chemistry data provide EPA a method for evaluating the numeric information and comparing to nutrient levels expected to maintain the beneficial use (see Table 5). Two of the three samples were greater than EPA's recommended TP criteria for streams in Ecoregion IX (Level III, Ecoregion 40).[10] All three samples were one to three times greater than the TP benchmark value developed by the RTAG.[11] One sample from spring 2007 also exceeded the Ecoregion criteria recommendation for total Kjeldahl nitrogen, and in fall 2007 one sample exceeded the nitrate-

nitrite nitrogen recommendation. The concentration of TP and nitrogen detected in the water quality samples indicate that water quality conditions may still persist that could lead to excess algal growth (Table 5).

Table 5. Nutrient data for Willow Branch. The recommended criteria values are from EPA Ecoregion IX, Level III, Ecoregion 40 and the RTAG benchmarks developed for Region 7. One asterisk (*) indicates exceedance of one benchmark. Two asterisks (**) indicates exceedance of both benchmark values.

	Total Phosphorus (mg/L)	**Total Kjeldahl Nitrogen (mg/L)**	**Nitrate-Nitrite Nitrogen (mg/L)**
EPA Ecoregion IX Criteria	*0.0925*	*0.625*	*0.23*
RTAG Benchmark	*0.075*	---	---
Fall 2006	0.25**	<0.5	<0.02
Spring 2007	0.08*	<0.5	0.25*
Fall 2006	0.11**	2.1*	0.16

For all the reasons described above, EPA does not believe the recent data submitted by MDNR is good cause for delisting this stream. Willow Branch was listed based on the presence of a pollution-tolerant community, and the new information indicates that those conditions still exist. The ***Stressor Identification*** study noted of several conditions that could be impacting the aquatic community, including sedimentation, nutrients, lack of riparian vegetation, and direct access to the stream by cattle. This information may help MDNR in identifying the pollutant(s) causing impairment in Willow Branch. EPA is not making changes to its decision in response to this comment, and is restoring Willow Branch to the 2004/2006 list as impaired by unknown pollutants.

MDNR also commented that EPA did not provide locational information with the addition of this water body to the 303(d) list in 2002. EPA has reviewed the record and is now correcting the previous omission. The sampling location for the ***Stressor Identification*** study was slightly downstream of Highway Y, 40°30'12.9" N, 92°55'07.8" W (latitude/longitude 40.503583/-92.918833). The visual/benthic low flow survey identified the sampling location as Willow Branch at Highway Y. From there, Willow Branch flows for approximately 0.6 miles to its confluence with North Blackbird Creek (40.4959/-92.9202). This can also be described in the same format as the legal descriptionsThn in Missouri's WQS: From Mouth (29,66N,18W) To 22,66N,18W. EPA is adding this description to the 2004/2006 list.

<u>Water Bodies Approved for Listing Without Changes</u>

EPA received general comments on several water body/pollutant pairs that were listed by MDNR and approved without changes by EPA. In reviewing Missouri's submission, EPA found that the record supported the state's decision to list these water bodies as impaired, and as such, approved the listings without changes. EPA is not making any changes to the list in response to the comments on the water body/pollutant pairs listed in Table 6.

Table 6. List of water bodies that EPA approved for listing about which people commented.

Water Body Name	WBID	Pollutant
Buffalo Ditch	3118	Low DO
Buffalo Ditch	3118	Ammonia
Crooked Creek	1928	Cadmium
Crooked Creek	1928	Lead
Indian Creek	1946	Lead
Indian Creek	1946	Zinc
Indian Creek, Tributary	3663	Lead
Indian Creek, Tributary	3663	Zinc
Shaw Branch	2170	Cadmium
Shaw Branch	2170	Lead
Strother Creek	2751U	Zinc
Turkey Creek	3216	Cadmium

Category 3B

EPA received one comment regarding its reference to Category 3B in its decision document. The commenter asserted that this category does not exist in Missouri and suggested that EPA set formal requirements and timelines for follow-up monitoring and assessment of those waters that had insufficient data until such time as MDNR uses the integrated reporting category format. While it might not be apparent where MDNR maintains the list of waters in Categories 1 - 5, pursuant to reporting requirements in CWA Section 303(d), 305(b) and 314, MDNR submits a database that contains an assessment of each water body. These assessments have a specific category assigned, as described in the state's listing methodology. EPA has verified that MDNR is utilizing Category 3B in that database, and in the 2008 update to MDNR's listing methodology Category 3B states that these waters will be given high priority for additional water quality monitoring.

Unclassified Waters and Narrative Criteria Listings

EPA received one comment expressing concern that unclassified waters and violations of the narrative criteria applicable to unclassified waters were not considered during the development of the 303(d) list. The commenter requested that EPA give more attention to this universe of water bodies and consider placing additional unclassified streams on the list. As discussed previously in this document, EPA supports MDNR's continued efforts to address these waters of the state. Where there is information indicating that narrative criteria have been violated, EPA has supported the listing of those segments. For example, EPA approved Missouri's decision to list several unclassified waters and proposed adding/restoring several more. EPA commends MDNR for their inclusion of impaired waters that violate the state's

narrative criteria by identifying violations through the use of screening values for inorganic sediment, metals in sediment, nutrients, fish tissue, biocriteria, and others. Current Missouri WQS do not contain numeric criteria for these pollutants. Using the screening values identified in the listing methodology allows MDNR to address impaired waters prior to the development and adoption of numeric criteria. Although EPA will allow the use of these screening values to place waters into Category 5, the screening value is not a substitute for a numeric WQS or a narrative WQS translator. The use of these screening values will not serve as a precedent for setting numeric WQS criteria; EPA must review and evaluate the scientific rationale provided with a numeric criterion independently at the time when a state submits new or revised WQS to EPA for review and approval.

Other Water Body-Specific Comments

Bee Fork (2760) – MDNR included Bee Fork on their 2004/2006 303(d) list as impaired by lead. MDNR commented that EPA inappropriately included this segment on the list based on an evaluation of stormwater data. EPA respectfully disagrees. The Agency's action was to approve MDNR's decision to include this segment on the 303(d) list with the addition of the entire classified segment length. Should Missouri decide to revise its assessment and listing decision for the 2008 list, EPA will review the change and relevant water quality data at the time that the list is submitted.

Another commenter expressed concern about the listing of Bee Fork and EPA's memo in the administrative record discussing a comment MDNR received during their public comment period on their draft list. The purpose of the memo was to explain that EPA reviewed the data submitted to MDNR and record our concurrence with the state's assessment and decision to list Bee Fork as impaired by lead. EPA approved Missouri's decision to list Bee Fork and is not making revisions to that decision in response to public comments.

Big Creek (2916) – One commenter disagreed with EPA's "approval" of Big Creek for placement in Category 4A. Federal regulations (40 CFR 130.7) explain EPA's authority to act on the 303(d) list, which corresponds to Category 5 under Missouri's listing methodology. EPA's action in the September 27, 2007, letter was to approve the delisting of Big Creek (2916) (i.e., removal from Category 5) and note that it is "appropriate for placement in Category 4A as a TMDL has been completed and approved by EPA." The EPA-approved TMDL addresses metals impairment to aquatic life.

The data submitted by MDNR includes sediment sampling data collected in 1996 from a site 0.5-mile downstream of the Glover smelter (Permit No. MO0001121), which shows 100 percent exceedance of probable effect level (PEL). There is also sediment sampling data collected in 2004 from a site 20 miles downstream, which shows only one exceedance of the PEL. The comment letter states that there is representative data from the last five years showing Big Creek to be in attainment for lead and, as such, the water should be placed in Category 2B or 3B. However, EPA found that the assessment worksheet does not contain data from the last five years collected immediately downstream of the smelter where the impairment was initially detected in 1996. In addition, monitoring reports for the facility, obtained from EPA's PCS

database[17], showed continued exceedances of the criteria for lead, cadmium, and zinc at the in-stream monitoring site in 2004 and 2005. As such, data are inconclusive in demonstrating attainment and in justifying placement in a Category other than Category 4A.

Big River (2074) – One commenter expressed concern over EPA's proposed decision to restore Big River to the 303(d) list as impaired by lead, and the public accessibility to the data. EPA assessed data provided by MDNR in its submission, which was made available to the public by MDNR during their public comment period on the draft list. Those data contained water chemistry data showing that the chronic criterion for lead was exceeded two times during the last three years. Those values were highlighted by MDNR and no explanation was provided as to why they were not considered in making the decision to delist Big River. The commenter also expressed concern about the listing of the entire classified segment. EPA's response to those concerns is provided earlier in this document.

Buffalo Ditch (3118) & Dutro Carter Creek (3569) – Missouri identified Buffalo Ditch (3118) and Dutro Carter Creek (3569) as impaired by ammonia on their 2004/2006 303(d) list. EPA concurred with the state's decision and approved their decision to list these waters. In their comments, MDNR indicated that they have more recent ammonia data for Buffalo Ditch (3118) and Dutro Carter Creek (3569). In their 2008 submission, if Missouri changes their assessment and proposes these water bodies for delisting, EPA will consider all the readily available information and act on changes to the list at that time. For the purposes of the 2004/2006 list, EPA is making no changes to the proposed list in response to this comment.

Regarding the assessment of ammonia data, EPA recommends that MDNR review the guidance provided in the 1999 criteria document (*1999 Update of Ambient Water Quality Criteria for Ammonia*, December 1999, EPA-822-R-99-014). The criteria document explains that the 30-day average concentration of total ammonia nitrogen should not exceed the chronic criterion more than once every 3 years. In addition, the highest 4-day average within the 30-day period should not exceed 2.5 times the chronic criterion. The criteria document further notes that when a threatened or endangered species occurs at a site and sufficient data indicate that it is sensitive at concentrations below the chronic criterion, it is appropriate to consider deriving a more stringent site-specific criterion.

Crooked Creek (1928) – One commenter stated that MDNR should not use sediment probable effect levels (PEL) as a basis for listing waters as impaired. EPA approved MDNR's decision to list Crooked Creek as impaired by cadmium and lead. While it is true that Missouri's standards do not contain a specific numeric criterion for sediment toxicity, the standards do contain narrative criteria that apply to all waters of the state. Those narrative criteria state that "waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal, or aquatic life." EPA supports the state's effort to implement its narrative criteria and include violations of the narrative criteria on its 303(d) list, as is required by federal regulations (40 CFR 130.7(b)(3)).

[17] EPA. Water Discharge Permit Compliance System database. Available online at: http://www.epa.gov/enviro/html/pcs/index.html

There was also concern about the test organisms used by the researchers to develop the PELs. In accordance with EPA guidance on the selection of test organisms for measuring the toxicity of sediment on freshwater invertebrates (*Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates. Second Edition*. EPA 600/R-99/064. March 2000), the authors selected the amphipod *Hyalella azteca* as a test species. The authors also used a species of midge, *Chironomus riparius*, which also meets eight of the ten criteria outlined in EPA's guidance for selecting test organisms. Both of these species are widely distributed in freshwater environments and commonly used for toxicity testing.

The commenter stated that MDNR should not use single grab samples to list water bodies because the chronic criterion is based on a 4-day average. As EPA explains in its 2006 IRG –

> Many state numeric water quality criteria include multiple day averaging periods, while most state monitoring programs do not collect samples at a rate of one or more per day. In such circumstances, states should decide how far out in time to extrapolate from the time at which a particular single grab was collected. EPA recommends that such decisions be based on contextual information regarding conditions when and where the grab was taken.

In their assessment, MDNR explains that the grab samples were taken during non-stormwater influenced flows. This information provides a reasonable basis for the state to interpret the grab sample as being representative of the 4-day period around the time when the sample was taken. EPA approved Missouri's decision to list Crooked Creek and is making no changes to its decision as a result of this comment.

Fabius River (55) – MDNR asked about the data used to assess Fabius River. EPA used data contained in a file (Multi Site FC&FS.xls) that was included in MDNR's submission of the list. MDNR commented that these older data were actually gathered on the South Fabius River (WBID 0071) and are no longer representative of current conditions. MDNR provided more recent data, which showed a violation of the 126 colonies/100 mL criterion in 2007. As such, EPA is adding South Fabius River to the list with the correct description (WBID 0071).

Indian Creek (420) – EPA proposed listing Indian Creek as impaired by chloride based on data submitted by MDNR showing three exceedances of the chronic criterion in the last three years of data. One exceedance (January 8, 2004) was acknowledged in MDNR's assessment, but the other two exceedances (March 2, 2004 and February 3, 2005) were excluded from evaluation. MDNR commented during the public comment period that those samples were collected during stormwater-influenced flow and not judged to be representative of the 96-hour (4-day) chronic averaging period surrounding the date of sample collection. EPA evaluated the hydrological stability for a period of time consisting of 4 days prior to and 3 days following the sampling dates for each of the three criterion violations. In the first instance (January 8, 2004), EPA confirmed MDNR's assessment that there was no rainfall during the 96-hour chronic averaging period. EPA agrees with MDNR's assessment that this sample is representative and is in violation of the chronic criterion. For the March 2, 2004 sample, there was a minor rainfall

event 2 days prior to sampling with an accompanying increase in stream discharge (Figure 7). In this case, the sampling event is not representative of a 96-hour average condition.

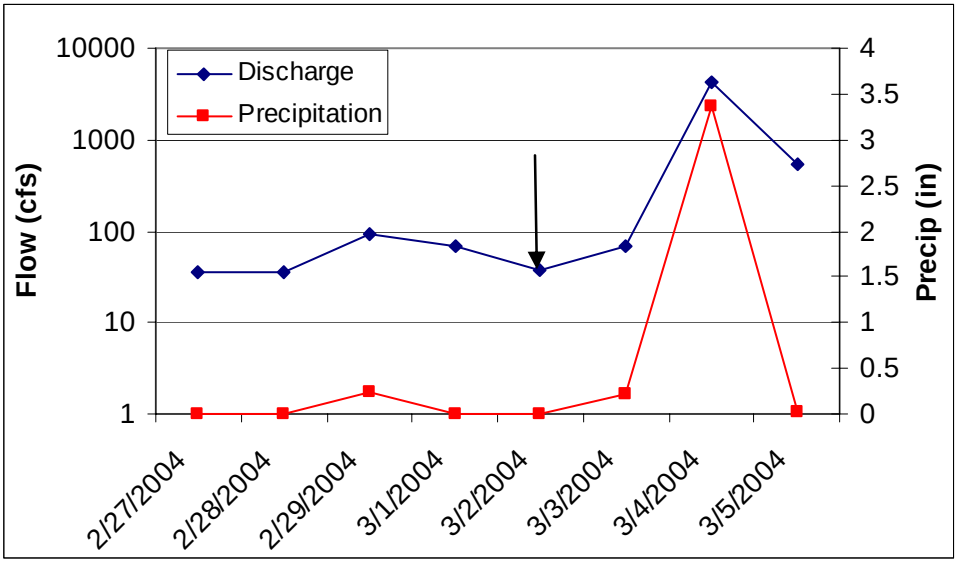

Figure 7. Flow and precipitation data for February 27, 2004 through March 5, 2004. Black arrow indicates the date of the chloride criterion violation (246 mg/L).

For the February 3, 2005, exceedance of the chronic chloride criterion, there was no rainfall event during the preceding 4 days. There was a 3-inch snowfall event 5 days prior (on January 29, 2005) recorded at the Kansas City International Airport. However, this event was not recorded at the Unity Village weather station, which is located closer to the chloride sampling station. The variation in stream discharge was less than what was observed in the conditions surrounding the March 2004 sample, explained above. For the February 2005 sample, the observed variation in discharge is likely due to snowmelt from the snowfall event, which did not extend far enough to the east of the sampling station to be recorded by the Unity Village weather station. Though a precipitation event likely triggered an increase in chloride concentration, Figure 8 illustrates that the sample concentration on February 3, 2005, is more likely a lower concentration, observed as the snow melt progressed, than would be expected immediately following the snowfall and in the days prior to sampling. Additionally, the chloride sample was taken on the fourth day of this variation in stream discharge, and as such, it is appropriate to consider this indicative of a condition lasting for at least 4 days. Therefore, EPA believes that the February 2, 2005, sample is an exceedance of the aquatic life chronic criterion for chloride and is making no revisions to its proposed listing based on this and other comments received.

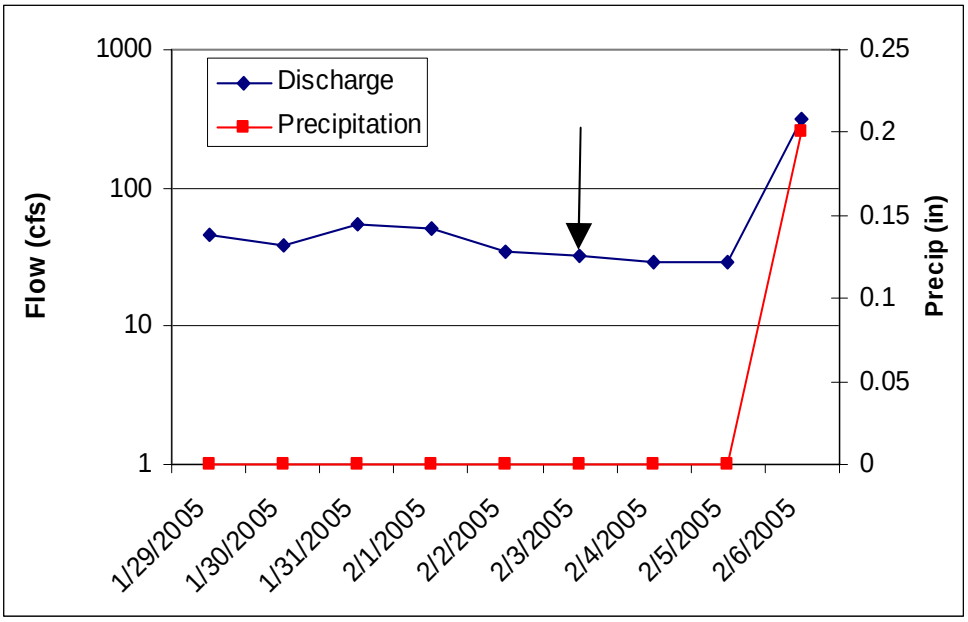

Figure 8. Flow and precipitation data for January 29, 2005 through February 6, 2005. Black arrow indicates the date of the chloride criterion violation (457 mg/L).

Mississippi River (1707) – EPA proposed restoring the Mississippi River to Missouri's list as impaired by lead and zinc. MDNR commented that the data do not indicate impairment. MDNR listed the Mississippi River in 1998 as contaminated by lead and zinc due to the Herculaneum Smelter. EPA reviewed the data submitted by MDNR with their 2004/2006 list and found that in the time since the 1998 listing, only one sample has been gathered downstream of the smelter and it indicates impairment of the aquatic life use based on probable effect levels of lead and zinc in the sediment. EPA is not making changes to its proposed decision in response to this comment.

Saline Creek, Tributary to (2859U) – MDNR included Tributary to Saline Creek on their 2004/2006 303(d) list as impaired by nickel. MDNR commented that the 2006 listing was based on an incorrect assessment. On September 27, 2007, EPA approved the listing of this segment with no changes. Since EPA has already taken final action to approve Missouri's decision to list this segment, EPA is not making any changes in response to this comment. Should Missouri decide to revise its assessment and listing decision for the 2008 list, EPA will review the change and relevant water quality data at the time that the list is submitted.

West Fork Black River (2755) – EPA received two comments on the proposed decision to restore the West Fork Black River to the 303(d) list as impaired by nutrients. The comments raised the following concerns: (1) Did EPA receive and consider the MDNR 2002-2003 *Stream Sampling Report: West Fork Black River near Doe Run West Fork Mine*?; (2) EPA did not provide the information from the administrative record to support this decision; (3) Missouri does not have water quality criteria for nutrients or chlorophyll α; (4) EPA did not identify the beneficial use that is impaired; and (5) Data does not indicate an impairment.

Responses:

(1) In response to the first concern, EPA had not received the *Stream Sampling Report: West Fork Black River near Doe Run West Fork Mine* from MDNR as part of their 2004/2006 303(d) list submission. MDNR provided this report to EPA during the public comment period. EPA reviewed the study report and is providing its conclusions of that review below.

(2) EPA received a request for information about the proposed decision to restore West Fork Black River to the 2004/2006 list. During a phone conversation with the commenter, it was EPA's understanding that the commenter was interested in receiving administrative records that were unique to EPA's record and not part of the assessment data made available by MDNR during the state's public notice on their draft list. EPA provided the commenter an administrative record memo describing EPA's review and referred to MDNR's assessment worksheet. In addition, the assessment worksheet submitted by MDNR is readily available on MDNR's website.[18] As explained in the public notice of EPA's September 24, 2008 proposed decision, the entire administrative record was available upon request for the duration of the 60-day public comment period. The commenter could have requested additional information, but EPA received no such request.

(3) While it is true that Missouri's standards do not contain a specific numeric criterion for nutrients, the standards do contain narrative criteria that apply to all waters of the state. Missouri listed West Fork Black River in 1998 based on violations of the narrative criteria. Those narrative criteria contain several conditions that Missouri could reasonably interpret to identify impairments caused by nutrients or chlorophyll α. The General Criteria (10 CSR 20-7.031(3) state:

> No water contaminant, by itself or in combination with other substances, shall prevent the waters of the state from meeting the following conditions: (A) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses… (C) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses.

(4) The TMDL information sheet on MDNR's website explains that the beneficial use impairment is WBC recreation.[19] The fact sheet further explains that there is a popular swimming location on West Fork Black River where MDNR "has received many complaints in recent years about unsightly bottom growths." These public comments indicate a violation of the narrative criteria described above.

(5) MDNR's assessment worksheet notes that while there is significantly more benthic algae downstream of the suspected source (Doe Run West Fork Mine discharge) during the

[18] MDNR. All water quality data information sheets. Zip file available online at: http://www.dnr.mo.gov/env/wpp/waterquality/303d/2006pn/303d-worksheets-xls.zip. Accessed December 17, 2008.
[19] MDNR. Total Maximum Daily Load Information Sheet: West Fork Black River. December 2004. Available online at: http://www.dnr.mo.gov/env/wpp/tmdl/info/2755-w-fk-black-r-info.pdf.

summer, the opposite is true during the winter months. As a result, MDNR states that the data is not conclusive. Given that this is a recreational use impairment (defined in Missouri's WQS as occurring from April 1 to October 31) and that conditions which would lead to excessive algal growth tend to occur during the summer, the winter data are not relevant to the discussion on the maintenance of a summer recreational beneficial use.

During EPA's public notice on the proposed decision, MDNR provided EPA with the full stream sampling report. The report contains periphyton (benthic chlorophyll α) sampling data from four sites, two located upstream of the Doe Run West Fork Mine discharge and two located immediately downstream. The data clearly indicate that there is a statistical difference between periphyton at the upper-most sampling location and each of the other three sites. While this data does not conclusively demonstrate that the Doe Run West Fork Mine discharge is the source causing increased algal growth, the periphyton levels detected in West Fork Black River correspond to nuisance levels of algae, as indicated by the nutrient benchmarks developed by the RTAG. Since MDNR did not provide any information indicating that the narrative criteria are no longer being violated, the RTAG benchmarks provide EPA a method for evaluating the numeric information gathered by MDNR and comparing that to levels of periphyton expected to maintain the beneficial use by preventing those conditions that were noted by public complaints on the narrative condition of the water body. Three of the four sites in the stream sampling report had samples that exceeded the RTAG benchmark for benthic chlorophyll α (40 milligrams per square meter).[11] These data suggest that conditions still persist that would violate the narrative criteria. As such, EPA is making no changes to the proposed list in response to this comment.

Other Changes

EPA added a column identifying the source causing impairment when this data was available from MDNR or from the 2002 303(d) list. In addition, MDNR found several miscellaneous errors in EPA's proposed decision. EPA is making the following revisions in response to those corrections:

- Correcting the year when the water body/pollutant pairs were first listed for Big River (2080, Cadmium and Zinc), Clear Creek (3239, Nutrients), and Village Creek (2863, Inorganic Sediment)
- Correcting the WBID and segment length for Blackberry Creek (3184)
- Correcting the county name for Deer Ridge Community Lake
- Correcting the segment length for Gravois Creek

Summary

After reviewing all the comments received on EPA's proposed decision on Missouri's 2004/2006 303(d) list, EPA is revising its decision on six water body/pollutant pairs. In each case, EPA reviewed the data and determined that MDNR provided good cause for delisting, or that the data was insufficient to support listing. Table 7 lists those waters that are no longer on the 303(d) list. Table 8 is the final 2004/2006 303(d) list for Missouri. It is comprised of 228 water body/pollutant pairs.

Table 7

Water body/pollutant pairs EPA approved for delisting in response to comments provided on EPA's proposed decision.

No.	Water Body Name	WBID	Class	Length/ Area Classified Segment	From	To	County	Pollutant	Comment
1	Fishpot Creek	2186	P	2.0	Mouth	13,44N,05E	St. Louis	Bacteria	No longer proposing to list. Error in assessment. Insufficient data.
2	Hickory Creek	588	C	7.0	Mouth	9,60N,25W	Grundy	Unknown	New data provided by MDNR. Delisting approved.
3	Long Branch	602	C	13.0	Mouth	11,59N,20W	Linn	Unknown	New data provided by MDNR. Delisting approved.
4	Sewer Branch	860	C	1.0	Mouth	16,46N,21W	Pettis	Unknown	Reevaluated 2002 data. No longer proposing to restore to list.
5	Sewer Branch	0860U	U	U			Pettis	Unknown	Reevaluated 2002 data. No longer proposing to restore to list.
6	St. Louis, Lake	7054	L3	525	NE SW26,47N,02E		St. Charles	Mercury	No longer proposing to list. Error in assessment. Data indicates attainment.

* There was no length/area specified on the 2002 list for this water body/pollutant pair.
NA = This water body/pollutant pair was not on the 2002 303(d) list.
/ = This water body/pollutant pair was not identified by MNDR as impaired on 2004/2006 303(d), and as such, there is no length/area to record.

Table 8

Final Consolidated 2004/2006 Missouri 303(d) List

This table is a summary of the September 27, 2007 decision, September 24, 2008 decision, and today's action. The "Length/Area" (miles/acres) listed in this table reflect the classified segment length according to Missouri's WQS 10 SCR 20-7.031 Tables G and H. The "Source" provided here was identified by MDNR in their 2004/2006 list submission or on the 2002 303(d) list as the source of the impairment. The "Year Listed" column identifies the first year a water body/pollutant pair was included on the 303(d) list. The "Listing Approved" column identifies those water body/pollutant pairs that were approved by EPA without changes. The "Approved Pollutant Change" column identifies those pollutant changes from the 2002 303(d) list that were approved by EPA. "Listing Approved, Segment Added by EPA" identifies those waters that EPA approved for listing, but added the entire classified segment to the list. "Restored by EPA" identifies those water body/pollutant pairs that were disapproved for delisting and EPA restored to the list. "Added by EPA" identifies those water body/pollutant pairs that EPA identified as impaired and added to the list. The "Change from EPA Proposed List" and "Comment" columns identify and describe those waters for which some aspect of the listing has been modified from EPA's proposed list in response to comments. The changes have been incorporated to the water body/pollutant pair descriptions.

No.	Water Body Name	WBID	Class	Length/ Area	From	To	County	Pollutant	Source	Year Listed	Listing Approved	Approved Pollutant Change	Listing Approved, Segment Added by EPA	Restored by EPA	Added by EPA	Change from EPA Proposed List	Comment
1	Bear Creek	115U	U	U	near Kirksville		Adair	Unknown		2002				X			
2	Bee Fork	2760	C	8.5	Mouth	30,32N,1W	Reynolds	Lead	Fletcher Mine	2006			X				
3	Belcher Branch Lake	7365	L3	55	08/17,55N,34W		Buchanan	Mercury		2006					X		
4	Big Bottom Creek	1746	C	1.9	Mouth	Lake Anne	Ste. Genevieve	Low DO	Lake Forest Subdivision	1998		BOD to Low DO	X				
5	Big Bottom Creek	1746	C	1.9	Mouth	Lake Anne	Ste. Genevieve	Organic Sediment	Lake Forest Subdivision	1998				X			
6	Big Creek	444	P	22.0	Mouth	9,63N,28W	Daviess, Harrison	Ammonia	Bethany WWTP	2006			X				
7	Big Creek	444	P	22.0	Mouth	9,63N,28W	Daviess, Harrison	Low DO	Bethany WWTP	2006			X				
8	Big Otter Creek, Tributary to	1225	C	1.0	Mouth	32,40N,25W	Henry	Low DO		2006					X		
9	Big River	2074	P	53.0	Mouth	Sur 3166,40N,3D	Jefferson	Lead	Old Lead Belt AML	1998				X			
10	Big River	2080	P	68.0	Sur 3166,40N,3D	12,35N,1E	Jefferson, Washington	Cadmium	Old Lead Belt AML	2006			X			X	Corrected year of listing from 2002 to 2006.
11	Big River	2080	P	68.0	Sur 3166,40N,3D	12,35N,1E	Jefferson, Washington	Lead	Old Lead Belt AML	1994			X				

No.	Water Body Name	WBID	Class	Length/ Area	From	To	County	Pollutant	Source	Year Listed	Listing Approved	Approved Pollutant Change	Listing Approved, Segment Added by EPA	Restored by EPA	Added by EPA	Change from EPA Proposed List	Comment
12	Big River	2080	P	68.0	Sur 3166,40N,3D	12,35N,1E	Jefferson, Washington	Inorganic Sediment	Old Lead Belt AML	1994		NVSS to Inorganic Sediment	X				
13	Big River	2080	P	68.0	Sur 3166,40N,3D	12,35N,1E	Jefferson, Washington	Zinc	Old Lead Belt AML	2006			X			X	Corrected year of listing from 2002 to 2006.
14	Blackberry Creek	3184	C	6.5	Mouth	28,30N,33W	Jasper	Sulfate + Chloride		2006					X	X	Corrected WBID and segment length.
15	Blue River	417	P	4.0	Mouth	Guinotte Dam	Jackson	Bacteria	Urban runoff	2006	X						
16	Blue River	418	P	9.0	Guinotte Dam	59th St.	Jackson	Bacteria	Urban runoff	2006	X						
17	Blue River	419	P	9.0	59th St.	Bannister Rd.	Jackson	Bacteria	Urban runoff	2006	X						
18	Blue River	421	C	11.0	Bannister Rd	State Line	Jackson	Bacteria		2006					X		
19	Bobs Creek	35	C	12.5	34,49N,2E	27,50,1E	Lincoln	Low DO	Lincoln Co. PWSD #1 WWTP	2006			X				
20	Bonne Femme Creek	750	P	7.0	Mouth	20,47N,12W	Boone	Bacteria		2006					X		
21	Brush Creek	1371	P	4.0	31,36N,24W	16,35N,24W	St. Clair, Polk	Low DO	Humansville WWTP	2002	X	BOD to Low DO					
22	Brush Creek	1371	P	4.0	31,36N,24W	16,35N,24W	St. Clair, Polk	Organic Sediment	Humansville WWTP	2002				X			
23	Buffalo Ditch	3118	P	18.0	State Line	11,18N,9E	Dunklin	Low DO	Kennett WWTP	1994		BOD to Low DO	X				
24	Buffalo Ditch	3118	P	18.0	State Line	11,18N,9E	Dunklin	Ammonia	Kennett WWTP	2006			X				
25	Burgher Branch	1865	C	2	Mouth	07,37N,07W	Phelps	Low DO		2006					X		
26	Busch W.A. #35	7057	L3	51	NE NE30,46N,03E		St. Charles	Mercury		2006					X		
27	Capps Creek	3234	P	4.0	Mouth	17, 25N,28W	Newton, Barry	Bacteria	Rural NPS	2006	X						
28	Cave Spring Branch	3245U	U	U			McDonald	Nutrients	Simmons Ind.	1998	X						
29	Cedar Creek, Trib. To	743	C	1.5	Mouth	14,49N,11W	Callaway	Low DO		2006					X		
30	Center Creek	3203	P	26.0	14,28N,34W	34,28N,31	Jasper	Cadmium	Tri-State AML	2006			X				
31	Center Creek	3203	P	26.0	14,28N,34W	34,28N,31	Jasper	Lead	Tri-State AML	2006			X				
32	Chariton River	640	P	110.0	Mouth	State Line	Chariton, Putnam	Bacteria	Rural NPS	2006			X				

No.	Water Body Name	WBID	Class	Length/ Area	From	To	County	Pollutant	Source	Year Listed	Listing Approved	Approved Pollutant Change	Listing Approved, Segment Added by EPA	Restored by EPA	Added by EPA	Change from EPA Proposed List	Comment
33	Clear Creek	1333	P	15.5	7,37N,27W	10,35N,29W	St. Clair, Vernon	Low DO		2006					X		
34	Clear Creek	1336	C	15.0	10,35N,29W	16,34N,30W	Vernon	Low DO		2006							
35	Clear Creek	3238	P	9	Mouth	28,26N,28W	Newton, Lawrence	Bacteria		2006					X		
36	Clear Creek	3239	C	3.0 (2.0)	28,26N,28W	36,26N,28W	Lawrence, Barry	Low DO	Monett WWTP	2006	X						
37	Clear Creek	3239	C	3.0 (2.0)	28,26N,28W	36,26N,28W	Lawrence, Barry	Nutrients	Monett WWTP	2002				X		X	Corrected year of listing from 1998 to 2002.
38	Clear Fork	935	P	24.5	Mouth	35,45N,25W	Johnson	Low DO		2006					X		
39	Clearwater Lake	7326	L2	1650	NW NE06,28N,03E		Reynolds	Mercury	Atmospheric Deposition	2002				X			
40	Coldwater Creek	1706	C	5.5	Mouth	Hwy. 67	St. Louis	Chloride		2006					X		
41	Coldwater Creek	1706	C	5.5	Mouth	Hwy. 67	St. Louis	Low DO		2006					X		
42	Courtois Creek	1943	P	30.0	Mouth	17,35N,1W	Crawford, Washington	Lead	Viburnum Mine Tailings	2006			X				
43	Courtois Creek	1943	P	30.0	Mouth	17,35N,1W	Crawford, Washington	Zinc	Viburnum Mine Tailings	2006			X				
44	Creve Coeur Creek	1703	C	2.0	Creve Coeur Lk	1mi. S. of Hwy. 340	St. Louis	Bacteria		2006					X		
45	Creve Coeur Creek	1703	C	2.0	Creve Coeur Lk	1mi. S. of Hwy. 341	St. Louis	Chloride		2006					X		
46	Creve Coeur Creek	1703	C	2.0	Creve Coeur Lk	1mi. S. of Hwy. 340	St. Louis	Low DO		2006					X		
47	Crooked Creek	1928	P	3.5	Mouth	33,35N,2W	Crawford	Cadmium	Casteel Mine	2006	X						
48	Crooked Creek	1928	P	3.5	Mouth	33,35N,2W	Crawford	Lead	Casteel Mine	2006	X						
49	Current River	2636	P	118.0	State Line	24,31N,6W	Ripley, Shannon	Mercury		2006					X		
50	Dardenne Creek	219	P1	7.0	Mouth	Sur 1704,47N,4E	St. Charles	Low DO		2006					X		
51	Dardenne Creek	221	P	15.0	Sur 1704,47N,4E	22,46N,2E	St. Charles	Inorganic Sediment	Suburban and Rural NPS	2006			X				
52	Dardenne Creek	221	P	15.0	Sur 1704,47N,4E	22,46N,2E	St. Charles	Unknown	Urban/Rural NPS	2002				X			
53	Dardenne Creek	222	C	6.0	22,46N,2E	22,46N,1E	St. Charles	Inorganic Sediment	Suburban and Rural NPS	2006			X				

No.	Water Body Name	WBID	Class	Length/ Area	From	To	County	Pollutant	Source	Year Listed	Listing Approved	Approved Pollutant Change	Listing Approved, Segment Added by EPA	Restored by EPA	Added by EPA	Change from EPA Proposed List	Comment
54	Dardenne Creek	222	C	6.0	22,46N,2E	22,46N,1E	St. Charles	Low DO		2006					X		
55	Dark Creek	690	C	8.0	Mouth	34,55N,15W	Randolph	Low DO		2006					X		
56	Deer Ridge Community Lake	7015	L3	48	18,62N,08W		Lewis	Mercury	Atmospheric Deposition	2002				X		X	Corrected County from Texas to Lewis.
57	Ditch #36	3109	P	7	Mouth	21,19N,10E	Dunklin	Low DO		2006					X		
58	Ditch to Buffalo Ditch	3120	P	12	Mouth	2,18N,9E	Dunklin	Low DO		2006					X		
59	Douger Branch	3168	C	4.5	Mouth	7,26N,25W	Lawrence	Cadmium	Aurora AML	2006			X				
60	Douger Branch	3168	C	4.5	Mouth	7,26N,25W	Lawrence	Lead	Aurora AML	2006			X				
61	Dousinbury Creek	1180	P	3.5	Mouth	17,33N,18W	Dallas	Bacteria	Rural NPS	2006	X						
62	Dutro Carter Creek	3569	P	1.5	Mouth	Hwy 72	Phelps	Ammonia	Rolla Southeast WWTP	2006			X				
63	Dutro Carter Creek	3569	P	1.5	Mouth	Hwy 72	Phelps	Low DO	Rolla Southeast WWTP	2006			X				
64	East Fork Chariton River	682	P	48.5	Mouth	Long Br. Dam	Randolph	Sulfate	Multiple AMLs	2006	X						
65	East Fork Grand River	457	P	25.0	Mouth	29,66N,30W	Gentry, Worth	Bacteria	Rural NPS	2006	X						
66	East Fork Locust Creek	3706	P	3.6	23,62N,20W	Hwy 6	Sullivan	Low DO	Milan WWTP	2006			X			X	Corrected WBID, length and segment description consistent with Table H in WQS.
67	East Fork Medicine Creek	619	P	36.0	9,61N,22W	State Line	Grundy, Putnam	Bacteria		2006					X		
68	East Fork Tebo Creek	1282	C	12.0	31,43N,24W	45,44N,24W	Henry	Low DO	Windsor Southwest Lagoon	2006			X				
69	Eaton Branch	2166	C	3.0	Mouth	9,36N,4E	St. Francois	Cadmium	Leadwood Tailings Pile	2006			X				
70	Eaton Branch	2166	C	3.0	Mouth	9,36N,4E	St. Francois	Lead	Leadwood Tailings Pile	2006			X				
71	Eaton Branch	2166	C	3.0	Mouth	9,36N,4E	St. Francois	Zinc	Leadwood Tailings Pile	2006			X				
72	Eleven Point River	2597	P	10.0	18,24N,2W	36,25N,4W	Oregon	Mercury		2006					X		

No.	Water Body Name	WBID	Class	Length/ Area	From	To	County	Pollutant	Source	Year Listed	Listing Approved	Approved Pollutant Change	Listing Approved, Segment Added by EPA	Restored by EPA	Added by EPA	Change from EPA Proposed List	Comment
73	Elm Branch	1283	C	3.0	Mouth	12,43N,24W	Henry	Low DO		2006					X		
74	Fishpot Creek	2186	P	2.0	Mouth	13,44N,05E	St. Louis	Low DO		2006					X		
75	Flat Creek	865	C	21.8	13,45N,21W	02,43N,23W	Pettis	Unknown	Unknown	2006			X				
76	Flat River Creek	2168	C	9.0	Mouth	21,36N,4E	St. Francois	Cadmium	Old Lead Belt AML	2006			X				
77	Flat River Creek	2168	C	9.0	Mouth	21,36N,4E	St. Francois	Lead	Old Lead Belt AML	1994			X				
78	Flat River Creek	2168	C	9.0	Mouth	21,36N,4E	St. Francois	Zinc	Old Lead Belt AML	1994			X				
79	Flat River Creek	2168	C	9.0	Mouth	21,36N,4E	St. Francois	Inorganic sediment	Old Lead Belt AML	1994		NVSS to Inorganic Sediment	X				
80	Fowler Creek	747	C	6	Mouth	13,46N,12W	Boone	Low DO		2006					X		
81	Gasconade River	1455	P	249.0	Mouth	6,29N,14W	Gasconade	Mercury	Atmospheric Deposition	2002				X			
82	Grand Glaize Creek	2184	C	4.0	Mouth	9,44N,5E	St. Louis	Chloride		2006					X		
83	Grand River	593	P	60.0	Mouth	Shoal Cr.	Chariton, Livingston	Bacteria	Rural NPS	2006	X						
84	Gravois Creek	1712	P	2.0	Mouth	24,44N,6E	St. Louis City, St. Louis	Bacteria	Urban runoff	2006	X						
85	Gravois Creek	1713	C	4.0	24,44N,6E	Hwy. 30	St. Louis	Bacteria	Urban runoff	2006	X						
86	Gravois Creek	1713	C	4.0	24,44N,6E	Hwy. 30	St. Louis	Chloride		2006					X		
87	Gravois Creek	1713	C	4.0	24,44N,6E	Hwy. 30	St. Louis	Low DO		2006					X	X	Corrected segment length.
88	Grindstone Creek	1009	C	1.5	Mouth	20,48N,12W	Boone	Bacteria	Unknown	2006	X						
89	Hickory Creek	442	C	1.5	Mouth	11,60N,28W	Daviess	Unknown		2002				X			
90	Hickory Creek	3226	P	4.5	Mouth	28,25N,31W	Newton	Bacteria	Unknown	2006			X				
91	Hickory Creek, Trib. to	589	C	1.0	Mouth	9,60N,25W	Grundy	Unknown		2002				X			
92	Hinkson Creek	1007	P	6.0	Mouth	Hwy 163	Boone	Unknown	Urban runoff	1998	X						
93	Hinkson Creek	1008	C	18.0	Hwy 163	36,50N,12W	Boone	Bacteria		2006					X		
94	Hinkson Creek	1008	C	18.0	Hwy 163	36,50N,12W	Boone	Unknown	Urban runoff	2006			X				
95	Hough Park Lake	7388	L3	7	19,44N,11W		Cole	Mercury	Atmospheric Deposition	2002				X			

No.	Water Body Name	WBID	Class	Length/ Area	From	To	County	Pollutant	Source	Year Listed	Listing Approved	Approved Pollutant Change	Listing Approved, Segment Added by EPA	Restored by EPA	Added by EPA	Change from EPA Proposed List	Comment
96	Indian Camp Creek	212	C	5.0	6,47N,1E	4,47N,1W	St. Charles, Warren	Inorganic sediment	JZ Landfill	1998				X			
97	Indian Creek	420	C	3.0	Mouth	State Line	Jackson	Chloride		2006					X		
98	Indian Creek	420	C	3.0	Mouth	State Line	Jackson	Bacteria	WWTP in Kansas, Urban runoff	2002	X	Fecal coliform to Bacteria					
99	Indian Creek	1946	C	1.5	Mouth	17,35N,1E	Washington	Lead	Viburnum Mine Tailings	2006	X						
100	Indian Creek	1946	C	1.5	Mouth	17,35N,1E	Washington	Zinc	Viburnum Mine Tailings	2002	X						
101	Indian Creek	3256	P	26.0	Mouth	24,24N,31W	McDonald, Newton	Bacteria	Rural NPS	2006			X				
102	Indian Creek, Tributary to	3663	C	0.5 (0.3)	Mouth	7,35N,1W	Washington	Lead	Viburnum Mine Tailings	2006	X						
103	Indian Creek, Tributary to	3663	C	0.5 (0.3)	Mouth	7,35N,1W	Washington	Zinc	Viburnum Mine Tailings	2006	X						
104	Jordan Creek	3374	P	3.8	29,29N,22W	13,29N,22W	Greene	Low DO		2006					X	X	Corrected name from Fassnight Creek.
105	Knob Noster State Park Lakes (Lake Buteo)	7196	L3	24	29/30/46N,24W		Johnson	Mercury	Atmospheric Deposition	2002				X			
106	Lamine River	847	P	54.0	Mouth	13,45N,19W	Cooper	Bacteria	Rural NPS	2006	X						
107	Lateral #2 Main Ditch	3105	P	11.5	24,23N,10E	25,25N,10E	Stoddard	Low DO		2006					X		
108	Lateral #2 Main Ditch	3105	P	11.5	24,23N,10E	25,25N,10E	Stoddard	Sediment		1998				X			
109	Lewistown Lake	7020	L1	29	NW SW8,61N,8W		Lewis	Atrazine	Crop production	2002	X						
110	Little Beaver Creek	1529	C	4.0	Mouth	8,37N,8W	Phelps	Low DO		2006					X		
111	Little Dry Fork	1863	P	5.0	Mouth	8,37N,7W	Phelps	Low DO	Rolla Southeast WWTP	2006			X				
112	Little Dry Fork	1864	C	4.5	8,37N,7W	5,36N,7W	Phelps	Low DO		2006					X		
113	Little Drywood Creek	1325	P	17	Mouth	13,34N,32W	Vernon	Low DO		2006					X		

No.	Water Body Name	WBID	Class	Length/ Area	From	To	County	Pollutant	Source	Year Listed	Listing Approved	Approved Pollutant Change	Listing Approved, Segment Added by EPA	Restored by EPA	Added by EPA	Change from EPA Proposed List	Comment
114	Little Muddy Creek, Tributary to	3490	C	0.4	Mouth	14,46N,22W	Pettis	Color	Tyson Foods	2006	X						
115	Little Muddy Creek, Tributary to	3490	C	0.4	Mouth	14,46N,22W	Pettis	Chloride	Tyson Foods	2006	X						
116	Little Niangua River	1189	P	43	Mouth	26,36N,19W	Camden, Dallas	Low DO		2006					X		
117	Little Osage River	3652	C	16.0	18,37N,31W	18,37N,33W	Vernon	Low DO		2002				X			
118	Locust Creek	606	P	84.0	Mouth	State Line	Chariton, Putnam	Bacteria		2006					X		
119	Long Branch	857	C	4.5	06,45N,23W	09,45N,24W	Pettis, Johnson	Unknown		2002				X			
120	Long Branch Creek	696	C	13.0	5,58N,14W	19,60N,14W	Macon	Low DO	Atlanta WWTP	2006			X				
121	Lost Creek	3278	P	8.5	State Line	14,25N,33W	Newton	Bacteria	Rural NPS	2006	X						
122	Main Ditch	2814	C	14.0	18,22N,6E	10,24N,6E	Butler	pH	Poplar Bluff WWTP	2006			X				
123	Main Ditch	2814	C	14.0	18,22N,6E	10,24N,6E	Butler	Ammonia	Poplar Bluff WWTP	2006			X				
124	Main Ditch	2814	C	14.0	18,22N,6E	10,24N,6E	Butler	Temperature	Stream Modification	2006	X						
125	Maline Creek	1709	C	1.0	Mouth	Bellefontaine Rd	St. Louis City, St. Louis	Chloride		2006					X		
126	Mark Twain Lake	7033	L2	18600	26,55N,07W		Ralls	Mercury	Atmospheric Deposition	2002				X			
127	Marmaton River	1308	P	49.5	19,38N,29W	State Line	Vernon	Low DO		2002				X			
128	McKay Park Lake (Sunset Lake)	7399	L3	6.0	13,44N,12W		Cole	Mercury		2006					X		
129	McKenzie Creek	2786	P	6.0	Mouth	23,29N,3E	Wayne	Low DO	Piedmont WWTP	2002		BOD to Low DO	X				
130	Meramec River	1841	P	37.0	Big R.	Meramec State Pk.	Jefferson, Franklin	Mercury		2006					X		
131	Miami Creek	1299	P	18.0	Mouth	10,40N,32W	Bates	Low DO		2006					X		
132	Middle Fork Grand River	468	P	25.0	Mouth	12,66N,31W	Gentry, Worth	Bacteria	Rural NPS	2006	X						
133	Mississippi River	1707	P	195.5	Ohio R.	Dam #27	Mississippi, St. Louis	Lead	Herculaneum smelter	1998				X			

No.	Water Body Name	WBID	Class	Length/ Area	From	To	County	Pollutant	Source	Year Listed	Listing Approved	Approved Pollutant Change	Listing Approved, Segment Added by EPA	Restored by EPA	Added by EPA	Change from EPA Proposed List	Comment
134	Mississippi River	1707	P	195.5	Ohio R.	Dam #27	Mississippi, St. Louis	Zinc	Herculaneum smelter	1998				X			
135	Mississippi River	3152	P	124.5	State Line	Ohio R.	Pemiscot, Mississippi	Mercury		2006					X		
136	Missouri River	1604	P	100.0	Mouth	Gasconade R.	St. Louis, Gasconade	Bacteria		2006					X		
137	Mound Branch	1300	C	10.0	Mouth	13,40N,31W	Bates	Low DO	Butler WWTP	1998		BOD to Low DO	X				
138	Muddy Creek	557	P	36.5	Mouth	22,66N,23W	Grundy, Mercer	Unknown		2002				X			
139	Muddy Creek	853	P	55.0	Mouth	17,45N,23W	Pettis, Johnson	Chloride		2006					X		
140	Muddy Creek	853	P	55.0	Mouth	17,45N,23W	Pettis	Color	Tyson Foods	2006			X				
141	Mussel Fork Creek	674	C	29.0	18,58N,17W	2,62N,18W	Macon, Sullivan	Bacteria		2006					X		
142	Niangua River	1170	P	51.0	Bennett Spr Cr.	33,32N,18W	Dallas	Bacteria	Unknown	2006			X				
143	No Creek	550	P	22.5	Mouth	14,62N,23W	Grundy	Bacteria	Rural NPS	2006	X						
144	Noblett Lake	7316	L3	26	25,26N,11W		Douglas	Mercury	Atmospheric Deposition	2002				X			
145	North Fork Cuivre River	170	C	8	24,51N,3W	28,52N,3W	Pike	Bacteria		2006					X		
146	North Fork Cuivre River	170	C	8	24,51N,3W	28,52N,3W	Pike	Low DO		2006					X		
147	North Fork Spring River	3188	C	51.5	1,29N,32W	20,30N,28W	Barton	Low DO	Lamar WWTP	2006			X				
148	North Fork Spring River	3188	C	51.5	1,29N,32W	20,30N,28W	Barton	Unknown	Unknown	2006			X				
149	North Fork Spring River	3188	C	51.5	1,29N,32W	20,30N,28W	Barton	Ammonia	Lamar WWTP	2006			X				
150	Osage River	1031	P	82.0	Mouth	Bagnell Dam	Osage, Miller	Low DO		2006					X		
151	Ozarks, Lake of the	7205	L2	59520	SE SE19,40N,15W		Camden	Fish Trauma		1998				X			
152	Panther Creek	1373	C	7.8	Mouth	13,35N,24W	Polk, Hickory	Low DO		2006					X		
153	Pearson Creek	2373	P	8.0	Mouth	5,29N,20W	Greene	Bacteria	Unknown	2006			X				
154	Pearson Creek	2373	P	8.0	Mouth	5,29N,20W	Greene	Unknown toxicity	Unknown	1998				X			

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155	Peruque Creek	217	P	4.0	Hwy. 40/61	25,47N,1E	St. Charles	Inorganic Sediment	Urban/Rural NPS	2002				X			
156	Peruque Creek	218	C	8.5	25,47N,1E	23,47N,1W	St. Charles	Inorganic Sediment	Urban/Rural NPS	2002				X			
157	Pickle Creek	1755	P	7.0	Mouth	19,36N,7E	Ste. Genevieve	pH	Natural	2006	X						
158	Piper Creek (Town Branch)	1444	P	7.5	Mouth	Hwy 83	Polk	Unknown	Unknown	2006			X				
159	Piper Creek (Town Branch)	1444	P	7.5	Mouth	Hwy 83	Polk	Organic Sediment	Bolivar WWTP, Unknown	1998		VSS to Organic Sediment	X				
160	Pond Creek, Trib. to	2128	C	1.0	Mouth	3,37N,3E	Washington	Inorganic Sediment	Barite Tailings Pond	1998				X			
161	Red Oak Creek	2038	C	9.0	28,42N,4W	16,41N,5W	Gasconade	Low DO		2006					X		
162	River des Peres	1711	C	1.0	Gravois Cr.	Morgan Ford Road	St. Louis City	Chloride		2006					X		
163	River des Peres	1711U - 001	U	U	at University City		St. Louis	Chloride		2006					X		
164	Roubidoux Creek	1512	P	4.0	Mouth	25,36N,12W	Pulaski	Low DO		2006					X		
165	Saline Creek, Trib. to	2859U	U	U			Madison	Nickel	Madison Mine	2006	X						
166	Salt River	91	P	29.0	Hwy. 79	Re-Reg Dam	Pike, Ralls	Mercury	Atmospheric Deposition	2002				X			
167	Sandy Creek	652	C	3.0	Mouth	19,66N,17W	Putnam	Unknown		2002				X			
168	Schuman Park Lake	7280	L3	5	02,37N,08W		Phelps	Mercury	Atmospheric Deposition	2002				X			
169	Shaw Branch	2170	C	2.0	Mouth	20,36N,5E	St. Francois	Cadmium	Federal AML	2006	X						
170	Shaw Branch	2170	C	2.0	Mouth	20,36N,5E	St. Francois	Lead	Federal AML	1994	X						
171	Shaw Branch	2170	C	2.0	Mouth	20,36N,5E	St. Francois	Inorganic Sediment	Federal AML	1994				X			
172	Shibboleth Creek	2120	C	3.0	14,38N,3E	21,38N,3E	Washington	Inorganic Sediment	Barite Tailings Pond	1998				X			
173	Shoal Creek	3231	C	4	12,23N,29W	Hwy. 86	Barry	Low DO		2006					X		
174	Sni-a-Bar Creek	399	P	32	Mouth	30,48N,29W	Lafayette, Jackson	Low DO		2006					X		
175	South Blackbird Creek	655	C	13.0	2,64N,17W	18,65N,18W	Putnam	Ammonia	Unknown	2006			X				

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176	South Fabius River	71	P	61.5	24,59N,6W	29,62N,11W	Marion, Knox	Bacteria		2006					X	X	Corrected name from Fabius River, WBID and segment description.
177	South Fork Salt River	142	C	32	Audrain Co. Line	5,49N,4W	Audrain	Low DO		2006					X		
178	South Grand River	1249	P	62.5	Mouth	02,44N,33W	Henry, Cass	Bacteria		2006					X		
179	Spring Branch (Creek)	3708	P	7.4	02,34N,06W	Hwy. 32	Dent	Organic Sediment	Salem WWTP	1994				X			
180	Spring Branch (Creek)	3708	P	7.4	02,34N,06W	Hwy. 32	Dent	Low DO	Salem WWTP	1994				X			
181	Spring River	3160	P	58.5	State Line	20,28N,27W	Jasper, Lawrence	Bacteria	Urban/Rural Point Sources/NPS	2006			X				
182	St. Johns Ditch	3138	P	35.0	29,23N,15E	25,28N,13E	New Madrid, Scott	Mercury		2006					X		
183	St. Johns Ditch	3138	P	35.0	29,23N,15E	25,28N,13E	New Madrid, Scott	Bacteria		2006					X		
184	Ste. Louise, Lake	7055	L3	87	SW SW27,47N,02E		St. Charles	Bacteria	Urban runoff	2002				X			
185	Stevenson Bayou	3135	C	14	33,25N,16E	31,27N,17E	Mississippi	Low DO		2006					X		
186	Stinson Creek	710	C	9.0	Mouth	16,47N,9W	Callaway	Low DO	Fulton WWTP	1994				X			
187	Stinson Creek	710	C	9.0	Mouth	16,47N,9W	Callaway	Organic Sediment	Fulton WWTP	1994				X			
188	Stockton Branch	1361	C	5.0	Mouth	4,34N,26W	Cedar	Low DO		2006					X		
189	Straight Fork	959	C	6.0	6,43N,17W	36,43N,18W	Morgan	Chloride		2006					X		
190	Straight Fork	959	C	6.0	6,43N,17W	36,43N,18W	Morgan	Low DO		2006					X		
191	Strother Creek	2751U	U	U			Reynolds	Zinc	Buick Mine	2006	X						
192	Sugar Creek	686	P	5.0	Mouth	Sugar Cr. Lake Dam	Randolph	Low DO		2006					X		
193	Table Rock Lake	7313	L2	43100	NW NW22,22N22W		Stone	Nutrients	Point Sources/NPS	2002	X						
194	Taneycomo, Lake	7314	L2	1730	SW NE8,23N,20W		Taney	Low DO	Table Rock Dam	1994			X				
195	Trib. To Red Oak Creek	3360	P	0.5	Mouth	35,42N,5W	Gasconade	Low DO		2006					X		
196	Trib. To Red Oak Creek	3361	C	1.5	35,42N,5W	27,42N,5W	Gasconade	Low DO		2006					X		

No.	Water Body Name	WBID	Class	Length/ Area	From	To	County	Pollutant	Source	Year Listed	Listing Approved	Approved Pollutant Change	Listing Approved, Segment Added by EPA	Restored by EPA	Added by EPA	Change from EPA Proposed List	Comment
197	Troublesome Creek	74	C	34	15,59N,7W	5,61N,10W	Marion, Knox	Low DO		2006					X	X	Corrected WBID and segment description.
198	Turkey Creek	3216	P	7.0	State Line	35,28N,33W	Jasper	Cadmium	Multiple AMLs	2006	X						
199	Turkey Creek	3216	P	7.0	State Line	35,28N,33W	Jasper	Bacteria		2006					X		
200	Turkey Creek	3282	P	2.4	Mouth	Hwy 47	St. Francois	Cadmium	Mine Tailings	2006			X				
201	Turkey Creek	3282	P	2.4	Mouth	Hwy 47	St. Francois	Zinc	Mine Tailings	2006			X				
202	Turkey Creek	3282	P	2.4	Mouth	Hwy 47	St. Francois	Lead	Mine Tailings	2006			X				
203	Village Creek	2863	P	1.5	Mouth	5,33N,7E	Madison	Inorganic Sediment	Mine La Motte AML	2006	X						Corrected year of listing from 1994 to 2006.
204	Village Creek	2863	P	1.5	Mouth	5,33N,7E	Madison	Manganese	Mine La Motte AML	2006	X						
205	Village Creek	2863	P	1.5	Mouth	5,33N,7E	Madison	Lead	Mine La Motte AML	2006	X						
206	Village Creek	2864	C	3.0	5,33N,7E	34,34N,7E	Madison	Inorganic Sediment	Mine La Motte AML	1994				X			
207	Walt Disney Lake	7137	L3	18	05,57N,18W		Linn	Chloride		2006					X		
208	Warm Fork Spring River	2579	P	12.0	State Line	25,23N,6W	Oregon	Bacteria	Unknown	2006			X				
209	Watkins Creek	1708	C	3.5	Mouth	Hwy. 270	St. Louis City, St. Louis	Bacteria	Urban runoff	2006	X						
210	Watkins Creek	1708	C	3.5	Mouth	Hwy. 270	St. Louis City, St. Louis	Chloride		2006					X		
211	Weldon River	560	P	42.0	Mouth	State Line	Grundy, Mercer	Bacteria		2006					X		
212	West Fork Black River	2755	P	31.7	Mouth	25,33N,03W	Reynolds	Nutrients	Doe Run West Fork Mine	1998				X			
213	West Fork Drywood Creek	1317	C	5.5	Mouth	State Line	Vernon	Low DO		2006					X		
214	West Fork Locust Creek	612	P	17.0	Mouth	Hwy. 67	Linn, Sullivan	Unknown		2002				X			
215	West Fork Locust Creek	613	C	17.0	Hwy. 6	33,64N,21W	Sullivan	Unknown		2002				X			
216	West Fork Medicine Creek	623	P	40.0	9,61N,22W	State Line	Grundy, Mercer	Unknown	Unknown	2006	X						

No.	Water Body Name	WBID	Class	Length/ Area	From	To	County	Pollutant	Source	Year Listed	Listing Approved	Approved Pollutant Change	Listing Approved, Segment Added by EPA	Restored by EPA	Added by EPA	Change from EPA Proposed List	Comment
217	West Fork Medicine Creek	623	P	40.0	9,61N,22W	State Line	Grundy, Mercer	Bacteria		2006					X		
218	West Fork Niangua River	1175	P	7	33,32N,18W	33,31N,18W	Webster	Low DO		2006					X		
219	West Yellow Creek	599	C	43.0	29,56N,19W	14,61N,19W	Sullivan	Low DO		2006					X	X	Corrected segment description.
220	Whetstone Creek	1504	P	13	Mouth	21,29N,13W	Wright	Low DO		2006					X		
221	Willow Branch	0654U	U	0.6 (U)	Mouth	22,66N,18W	Putnam	Unknown		2002				X		X	Added length and locational information.
222	Willow Fork	955	C	6.5	36,45N,17W	29,45N,17W	Moniteau	Low DO		2006					X		
223	Willow Fork, Tributary to	956	C	0.5	Mouth	27,45N,17W	Moniteau	Low DO	Tipton WWTP	2006	X						
224	Wilson Creek	2375	P	18.0	Mouth	16,29N,22W	Greene	Unknown toxicity		2002				X			
225	Wilson Creek	2375	P	18.0	Mouth	16,29N,22W	Greene	Bacteria		2006					X		
226	Wolf Creek	2879	C	8	Mouth	29,36N,6E	St. Francois	Low DO		2006					X		
227	Wolf Creek, Trib. To	3589	C	1.5	Hwy. 32	Hwy. D	St. Francois	Low DO		2006					X		
228	Woods, Lake of the	7436	L3	3	NE,02,48N,12W		Boone	Mercury	Atmospheric Deposition	2002				X			

* There was no length/area specified on the 2002 list for this water body/pollutant pair.
NA = This water body/pollutant pair was not on the 2002 303(d) list.
/ = This water body/pollutant pair was not identified by MNDR as impaired on 2004/2006 303(d), and as such, there is no length/area to record.
( ) = For reference, the segment length/area according to Table H in Missouri's water quality standards in included in parentheses. In these instances, the length/area of the listed segment is that identified by MDNR.
(U) = The water body is unclassified, and as such, the length identified is not the "classified" segment length.
AML = Abandoned Mine Land
NPS = Non Point Source

Final Consolidated 2004/2006 Missouri 303(d) List

This table is a summary of the September 27, 2007 decision, September 24, 2008 decision, and today's action. The "Length/Area" (miles/acres) listed in this table reflect the classified segment length according to Missouri's WQS 10 SCR 20-7.031 Tables G and H. The "Source" provided here was identified by MDNR in their 2004/2006 list submission or on the 2002 303(d) list as the source of the impairment. The "Year Listed" column identifies the first year a water body/pollutant pair was included on the 303(d) list. The "Listing Approved" column identifies those water body/pollutant pairs that were approved by EPA without changes. The "Approved Pollutant Change" column identifies those pollutant changes from the 2002 303(d) list that were approved by EPA. "Listing Approved, Segment Added by EPA" identifies those waters that EPA approved for listing, but added the entire classified segment to the list. "Restored by EPA" identifies those water body/pollutant pairs that were disapproved for delisting and EPA restored to the list. "Added by EPA" identifies those water body/pollutant pairs that EPA identified as impaired and added to the list. The "Change from EPA Proposed List" and "Comment" columns identify and describe those waters for which some aspect of the listing has been modified from EPA's proposed list in response to comments. The changes have been incorporated to the water body/pollutant pair descriptions. This table is also found in EPA's response to public comments as Table 8.

No.	Water Body Name	WBID	Class	Length/ Area	From	To	County	Pollutant	Source	Year Listed	Listing Approved	Approved Pollutant Change	Listing Approved, Segment Added by EPA	Restored by EPA	Added by EPA	Change from EPA Proposed List	Comment
1	Bear Creek	115U	U	U	near Kirksville		Adair	Unknown		2002				X			
2	Bee Fork	2760	C	8.5	Mouth	30,32N,1W	Reynolds	Lead	Fletcher Mine	2006			X				
3	Belcher Branch Lake	7365	L3	55	08/17,55N,34W		Buchanan	Mercury		2006					X		
4	Big Bottom Creek	1746	C	1.9	Mouth	Lake Anne	Ste. Genevieve	Low DO	Lake Forest Subdivision	1998		BOD to Low DO	X				
5	Big Bottom Creek	1746	C	1.9	Mouth	Lake Anne	Ste. Genevieve	Organic Sediment	Lake Forest Subdivision	1998				X			
6	Big Creek	444	P	22.0	Mouth	9,63N,28W	Daviess, Harrison	Ammonia	Bethany WWTP	2006			X				
7	Big Creek	444	P	22.0	Mouth	9,63N,28W	Daviess, Harrison	Low DO	Bethany WWTP	2006			X				
8	Big Otter Creek, Tributary to	1225	C	1.0	Mouth	32,40N,25W	Henry	Low DO		2006					X		
9	Big River	2074	P	53.0	Mouth	Sur 3166,40N,3D	Jefferson	Lead	Old Lead Belt AML	1998				X			
10	Big River	2080	P	68.0	Sur 3166,40N,3D	12,35N,1E	Jefferson, Washington	Cadmium	Old Lead Belt AML	2006			X			X	Corrected year of listing from 2002 to 2006.
11	Big River	2080	P	68.0	Sur 3166,40N,3D	12,35N,1E	Jefferson, Washington	Lead	Old Lead Belt AML	1994			X				

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12	Big River	2080	P	68.0	Sur 3166,40N,3D	12,35N,1E	Jefferson, Washington	Inorganic Sediment	Old Lead Belt AML	1994		NVSS to Inorganic Sediment	X				
13	Big River	2080	P	68.0	Sur 3166,40N,3D	12,35N,1E	Jefferson, Washington	Zinc	Old Lead Belt AML	2006			X			X	Corrected year of listing from 2002 to 2006.
14	Blackberry Creek	3184	C	6.5	Mouth	28,30N,33W	Jasper	Sulfate + Chloride		2006					X	X	Corrected WBID and segment length.
15	Blue River	417	P	4.0	Mouth	Guinotte Dam	Jackson	Bacteria	Urban runoff	2006	X						
16	Blue River	418	P	9.0	Guinotte Dam	59th St.	Jackson	Bacteria	Urban runoff	2006	X						
17	Blue River	419	P	9.0	59th St.	Bannister Rd.	Jackson	Bacteria	Urban runoff	2006	X						
18	Blue River	421	C	11.0	Bannister Rd	State Line	Jackson	Bacteria		2006					X		
19	Bobs Creek	35	C	12.5	34,49N,2E	27,50,1E	Lincoln	Low DO	Lincoln Co. PWSD #1 WWTP	2006			X				
20	Bonne Femme Creek	750	P	7.0	Mouth	20,47N,12W	Boone	Bacteria		2006					X		
21	Brush Creek	1371	P	4.0	31,36N,24W	16,35N,24W	St. Clair, Polk	Low DO	Humansville WWTP	2002	X	BOD to Low DO					
22	Brush Creek	1371	P	4.0	31,36N,24W	16,35N,24W	St. Clair, Polk	Organic Sediment	Humansville WWTP	2002				X			
23	Buffalo Ditch	3118	P	18.0	State Line	11,18N,9E	Dunklin	Low DO	Kennett WWTP	1994		BOD to Low DO	X				
24	Buffalo Ditch	3118	P	18.0	State Line	11,18N,9E	Dunklin	Ammonia	Kennett WWTP	2006			X				
25	Burgher Branch	1865	C	2	Mouth	07,37N,07W	Phelps	Low DO		2006					X		
26	Busch W.A. #35	7057	L3	51	NE NE30,46N,03E		St. Charles	Mercury		2006					X		
27	Capps Creek	3234	P	4.0	Mouth	17, 25N,28W	Newton, Barry	Bacteria	Rural NPS	2006	X						
28	Cave Spring Branch	3245U	U	U			McDonald	Nutrients	Simmons Ind.	1998	X						
29	Cedar Creek, Trib. To	743	C	1.5	Mouth	14,49N,11W	Callaway	Low DO		2006					X		
30	Center Creek	3203	P	26.0	14,28N,34W	34,28N,31	Jasper	Cadmium	Tri-State AML	2006			X				
31	Center Creek	3203	P	26.0	14,28N,34W	34,28N,31	Jasper	Lead	Tri-State AML	2006			X				
32	Chariton River	640	P	110.0	Mouth	State Line	Chariton, Putnam	Bacteria	Rural NPS	2006			X				

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33	Clear Creek	1333	P	15.5	7,37N,27W	10,35N,29W	St. Clair, Vernon	Low DO		2006					X		
34	Clear Creek	1336	C	15.0	10,35N,29W	16,34N,30W	Vernon	Low DO		2006							
35	Clear Creek	3238	P	9	Mouth	28,26N,28W	Newton, Lawrence	Bacteria		2006					X		
36	Clear Creek	3239	C	3.0 (2.0)	28,26N,28W	36,26N,28W	Lawrence, Barry	Low DO	Monett WWTP	2006	X						
37	Clear Creek	3239	C	3.0 (2.0)	28,26N,28W	36,26N,28W	Lawrence, Barry	Nutrients	Monett WWTP	2002				X		X	Corrected year of listing from 1998 to 2002.
38	Clear Fork	935	P	24.5	Mouth	35,45N,25W	Johnson	Low DO		2006					X		
39	Clearwater Lake	7326	L2	1650	NW NE06,28N,03E		Reynolds	Mercury	Atmospheric Deposition	2002				X			
40	Coldwater Creek	1706	C	5.5	Mouth	Hwy. 67	St. Louis	Chloride		2006					X		
41	Coldwater Creek	1706	C	5.5	Mouth	Hwy. 67	St. Louis	Low DO		2006					X		
42	Courtois Creek	1943	P	30.0	Mouth	17,35N,1W	Crawford, Washington	Lead	Viburnum Mine Tailings	2006			X				
43	Courtois Creek	1943	P	30.0	Mouth	17,35N,1W	Crawford, Washington	Zinc	Viburnum Mine Tailings	2006			X				
44	Creve Coeur Creek	1703	C	2.0	Creve Coeur Lk	1mi. S. of Hwy. 340	St. Louis	Bacteria		2006					X		
45	Creve Coeur Creek	1703	C	2.0	Creve Coeur Lk	1mi. S. of Hwy. 341	St. Louis	Chloride		2006					X		
46	Creve Coeur Creek	1703	C	2.0	Creve Coeur Lk	1mi. S. of Hwy. 340	St. Louis	Low DO		2006					X		
47	Crooked Creek	1928	P	3.5	Mouth	33,35N,2W	Crawford	Cadmium	Casteel Mine	2006	X						
48	Crooked Creek	1928	P	3.5	Mouth	33,35N,2W	Crawford	Lead	Casteel Mine	2006	X						
49	Current River	2636	P	118.0	State Line	24,31N,6W	Ripley, Shannon	Mercury		2006					X		
50	Dardenne Creek	219	P1	7.0	Mouth	Sur 1704,47N,4E	St. Charles	Low DO		2006					X		
51	Dardenne Creek	221	P	15.0	Sur 1704,47N,4E	22,46N,2E	St. Charles	Inorganic Sediment	Suburban and Rural NPS	2006			X				
52	Dardenne Creek	221	P	15.0	Sur 1704,47N,4E	22,46N,2E	St. Charles	Unknown	Urban/Rural NPS	2002				X			
53	Dardenne Creek	222	C	6.0	22,46N,2E	22,46N,1E	St. Charles	Inorganic Sediment	Suburban and Rural NPS	2006			X				

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54	Dardenne Creek	222	C	6.0	22,46N,2E	22,46N,1E	St. Charles	Low DO		2006					X		
55	Dark Creek	690	C	8.0	Mouth	34,55N,15W	Randolph	Low DO		2006					X		
56	Deer Ridge Community Lake	7015	L3	48	18,62N,08W		Lewis	Mercury	Atmospheric Deposition	2002				X		X	Corrected County from Texas to Lewis.
57	Ditch #36	3109	P	7	Mouth	21,19N,10E	Dunklin	Low DO		2006					X		
58	Ditch to Buffalo Ditch	3120	P	12	Mouth	2,18N,9E	Dunklin	Low DO		2006					X		
59	Douger Branch	3168	C	4.5	Mouth	7,26N,25W	Lawrence	Cadmium	Aurora AML	2006			X				
60	Douger Branch	3168	C	4.5	Mouth	7,26N,25W	Lawrence	Lead	Aurora AML	2006			X				
61	Dousinbury Creek	1180	P	3.5	Mouth	17,33N,18W	Dallas	Bacteria	Rural NPS	2006	X						
62	Dutro Carter Creek	3569	P	1.5	Mouth	Hwy 72	Phelps	Ammonia	Rolla Southeast WWTP	2006			X				
63	Dutro Carter Creek	3569	P	1.5	Mouth	Hwy 72	Phelps	Low DO	Rolla Southeast WWTP	2006			X				
64	East Fork Chariton River	682	P	48.5	Mouth	Long Br. Dam	Randolph	Sulfate	Multiple AMLs	2006	X						
65	East Fork Grand River	457	P	25.0	Mouth	29,66N,30W	Gentry, Worth	Bacteria	Rural NPS	2006	X						
66	East Fork Locust Creek	3706	P	3.6	23,62N,20W	Hwy 6	Sullivan	Low DO	Milan WWTP	2006			X			X	Corrected WBID, length and segment description consistent with Table H in WQS.
67	East Fork Medicine Creek	619	P	36.0	9,61N,22W	State Line	Grundy, Putnam	Bacteria		2006					X		
68	East Fork Tebo Creek	1282	C	12.0	31,43N,24W	45,44N,24W	Henry	Low DO	Windsor Southwest Lagoon	2006			X				
69	Eaton Branch	2166	C	3.0	Mouth	9,36N,4E	St. Francois	Cadmium	Leadwood Tailings Pile	2006			X				
70	Eaton Branch	2166	C	3.0	Mouth	9,36N,4E	St. Francois	Lead	Leadwood Tailings Pile	2006			X				
71	Eaton Branch	2166	C	3.0	Mouth	9,36N,4E	St. Francois	Zinc	Leadwood Tailings Pile	2006			X				
72	Eleven Point River	2597	P	10.0	18,24N,2W	36,25N,4W	Oregon	Mercury		2006					X		

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73	Elm Branch	1283	C	3.0	Mouth	12,43N,24W	Henry	Low DO		2006					X		
74	Fishpot Creek	2186	P	2.0	Mouth	13,44N,05E	St. Louis	Low DO		2006					X		
75	Flat Creek	865	C	21.8	13,45N,21W	02,43N,23W	Pettis	Unknown	Unknown	2006			X				
76	Flat River Creek	2168	C	9.0	Mouth	21,36N,4E	St. Francois	Cadmium	Old Lead Belt AML	2006			X				
77	Flat River Creek	2168	C	9.0	Mouth	21,36N,4E	St. Francois	Lead	Old Lead Belt AML	1994			X				
78	Flat River Creek	2168	C	9.0	Mouth	21,36N,4E	St. Francois	Zinc	Old Lead Belt AML	1994			X				
79	Flat River Creek	2168	C	9.0	Mouth	21,36N,4E	St. Francois	Inorganic sediment	Old Lead Belt AML	1994		NVSS to Inorganic Sediment	X				
80	Fowler Creek	747	C	6	Mouth	13,46N,12W	Boone	Low DO		2006					X		
81	Gasconade River	1455	P	249.0	Mouth	6,29N,14W	Gasconade	Mercury	Atmospheric Deposition	2002				X			
82	Grand Glaize Creek	2184	C	4.0	Mouth	9,44N,5E	St. Louis	Chloride		2006					X		
83	Grand River	593	P	60.0	Mouth	Shoal Cr.	Chariton, Livingston	Bacteria	Rural NPS	2006	X						
84	Gravois Creek	1712	P	2.0	Mouth	24,44N,6E	St. Louis City, St. Louis	Bacteria	Urban runoff	2006	X						
85	Gravois Creek	1713	C	4.0	24,44N,6E	Hwy. 30	St. Louis	Bacteria	Urban runoff	2006	X						
86	Gravois Creek	1713	C	4.0	24,44N,6E	Hwy. 30	St. Louis	Chloride		2006					X		
87	Gravois Creek	1713	C	4.0	24,44N,6E	Hwy. 30	St. Louis	Low DO		2006					X	X	Corrected segment length.
88	Grindstone Creek	1009	C	1.5	Mouth	20,48N,12W	Boone	Bacteria	Unknown	2006	X						
89	Hickory Creek	442	C	1.5	Mouth	11,60N,28W	Daviess	Unknown		2002				X			
90	Hickory Creek	3226	P	4.5	Mouth	28,25N,31W	Newton	Bacteria	Unknown	2006			X				
91	Hickory Creek, Trib. to	589	C	1.0	Mouth	9,60N,25W	Grundy	Unknown		2002				X			
92	Hinkson Creek	1007	P	6.0	Mouth	Hwy 163	Boone	Unknown	Urban runoff	1998	X						
93	Hinkson Creek	1008	C	18.0	Hwy 163	36,50N,12W	Boone	Bacteria		2006					X		
94	Hinkson Creek	1008	C	18.0	Hwy 163	36,50N,12W	Boone	Unknown	Urban runoff	2006			X				
95	Hough Park Lake	7388	L3	7	19,44N,11W		Cole	Mercury	Atmospheric Deposition	2002				X			

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96	Indian Camp Creek	212	C	5.0	6,47N,1E	4,47N,1W	St. Charles, Warren	Inorganic sediment	JZ Landfill	1998				X			
97	Indian Creek	420	C	3.0	Mouth	State Line	Jackson	Chloride		2006					X		
98	Indian Creek	420	C	3.0	Mouth	State Line	Jackson	Bacteria	WWTP in Kansas, Urban runoff	2002	X	Fecal coliform to Bacteria					
99	Indian Creek	1946	C	1.5	Mouth	17,35N,1E	Washington	Lead	Viburnum Mine Tailings	2006	X						
100	Indian Creek	1946	C	1.5	Mouth	17,35N,1E	Washington	Zinc	Viburnum Mine Tailings	2002	X						
101	Indian Creek	3256	P	26.0	Mouth	24,24N,31W	McDonald, Newton	Bacteria	Rural NPS	2006			X				
102	Indian Creek, Tributary to	3663	C	0.5 (0.3)	Mouth	7,35N,1W	Washington	Lead	Viburnum Mine Tailings	2006	X						
103	Indian Creek, Tributary to	3663	C	0.5 (0.3)	Mouth	7,35N,1W	Washington	Zinc	Viburnum Mine Tailings	2006	X						
104	Jordan Creek	3374	P	3.8	29,29N,22W	13,29N,22W	Greene	Low DO		2006					X	X	Corrected name from Fassnight Creek.
105	Knob Noster State Park Lakes (Lake Buteo)	7196	L3	24	29/30/46N,24W		Johnson	Mercury	Atmospheric Deposition	2002				X			
106	Lamine River	847	P	54.0	Mouth	13,45N,19W	Cooper	Bacteria	Rural NPS	2006	X						
107	Lateral #2 Main Ditch	3105	P	11.5	24,23N,10E	25,25N,10E	Stoddard	Low DO		2006					X		
108	Lateral #2 Main Ditch	3105	P	11.5	24,23N,10E	25,25N,10E	Stoddard	Sediment		1998				X			
109	Lewistown Lake	7020	L1	29	NW SW8,61N,8W		Lewis	Atrazine	Crop production	2002	X						
110	Little Beaver Creek	1529	C	4.0	Mouth	8,37N,8W	Phelps	Low DO		2006					X		
111	Little Dry Fork	1863	P	5.0	Mouth	8,37N,7W	Phelps	Low DO	Rolla Southeast WWTP	2006			X				
112	Little Dry Fork	1864	C	4.5	8,37N,7W	5,36N,7W	Phelps	Low DO		2006					X		
113	Little Drywood Creek	1325	P	17	Mouth	13,34N,32W	Vernon	Low DO		2006					X		

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114	Little Muddy Creek, Tributary to	3490	C	0.4	Mouth	14,46N,22W	Pettis	Color	Tyson Foods	2006	X						
115	Little Muddy Creek, Tributary to	3490	C	0.4	Mouth	14,46N,22W	Pettis	Chloride	Tyson Foods	2006	X						
116	Little Niangua River	1189	P	43	Mouth	26,36N,19W	Camden, Dallas	Low DO		2006					X		
117	Little Osage River	3652	C	16.0	18,37N,31W	18,37N,33W	Vernon	Low DO		2002				X			
118	Locust Creek	606	P	84.0	Mouth	State Line	Chariton, Putnam	Bacteria		2006					X		
119	Long Branch	857	C	4.5	06,45N,23W	09,45N,24W	Pettis, Johnson	Unknown		2002				X			
120	Long Branch Creek	696	C	13.0	5,58N,14W	19,60N,14W	Macon	Low DO	Atlanta WWTP	2006			X				
121	Lost Creek	3278	P	8.5	State Line	14,25N,33W	Newton	Bacteria	Rural NPS	2006	X						
122	Main Ditch	2814	C	14.0	18,22N,6E	10,24N,6E	Butler	pH	Poplar Bluff WWTP	2006			X				
123	Main Ditch	2814	C	14.0	18,22N,6E	10,24N,6E	Butler	Ammonia	Poplar Bluff WWTP	2006			X				
124	Main Ditch	2814	C	14.0	18,22N,6E	10,24N,6E	Butler	Temperature	Stream Modification	2006	X						
125	Maline Creek	1709	C	1.0	Mouth	Bellefontaine Rd	St. Louis City, St. Louis	Chloride		2006					X		
126	Mark Twain Lake	7033	L2	18600	26,55N,07W		Ralls	Mercury	Atmospheric Deposition	2002				X			
127	Marmaton River	1308	P	49.5	19,38N,29W	State Line	Vernon	Low DO		2002				X			
128	McKay Park Lake (Sunset Lake)	7399	L3	6.0	13,44N,12W		Cole	Mercury		2006					X		
129	McKenzie Creek	2786	P	6.0	Mouth	23,29N,3E	Wayne	Low DO	Piedmont WWTP	2002		BOD to Low DO	X				
130	Meramec River	1841	P	37.0	Big R.	Meramec State Pk.	Jefferson, Franklin	Mercury		2006					X		
131	Miami Creek	1299	P	18.0	Mouth	10,40N,32W	Bates	Low DO		2006					X		
132	Middle Fork Grand River	468	P	25.0	Mouth	12,66N,31W	Gentry, Worth	Bacteria	Rural NPS	2006	X						
133	Mississippi River	1707	P	195.5	Ohio R.	Dam #27	Mississippi, St. Louis	Lead	Herculaneum smelter	1998				X			

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134	Mississippi River	1707	P	195.5	Ohio R.	Dam #27	Mississippi, St. Louis	Zinc	Herculaneum smelter	1998				X			
135	Mississippi River	3152	P	124.5	State Line	Ohio R.	Pemiscot, Mississippi	Mercury		2006					X		
136	Missouri River	1604	P	100.0	Mouth	Gasconade R.	St. Louis, Gasconade	Bacteria		2006					X		
137	Mound Branch	1300	C	10.0	Mouth	13,40N,31W	Bates	Low DO	Butler WWTP	1998		BOD to Low DO	X				
138	Muddy Creek	557	P	36.5	Mouth	22,66N,23W	Grundy, Mercer	Unknown		2002				X			
139	Muddy Creek	853	P	55.0	Mouth	17,45N,23W	Pettis, Johnson	Chloride		2006					X		
140	Muddy Creek	853	P	55.0	Mouth	17,45N,23W	Pettis	Color	Tyson Foods	2006			X				
141	Mussel Fork Creek	674	C	29.0	18,58N,17W	2,62N,18W	Macon, Sullivan	Bacteria		2006					X		
142	Niangua River	1170	P	51.0	Bennett Spr Cr.	33,32N,18W	Dallas	Bacteria	Unknown	2006			X				
143	No Creek	550	P	22.5	Mouth	14,62N,23W	Grundy	Bacteria	Rural NPS	2006	X						
144	Noblett Lake	7316	L3	26	25,26N,11W		Douglas	Mercury	Atmospheric Deposition	2002				X			
145	North Fork Cuivre River	170	C	8	24,51N,3W	28,52N,3W	Pike	Bacteria		2006					X		
146	North Fork Cuivre River	170	C	8	24,51N,3W	28,52N,3W	Pike	Low DO		2006					X		
147	North Fork Spring River	3188	C	51.5	1,29N,32W	20,30N,28W	Barton	Low DO	Lamar WWTP	2006			X				
148	North Fork Spring River	3188	C	51.5	1,29N,32W	20,30N,28W	Barton	Unknown	Unknown	2006			X				
149	North Fork Spring River	3188	C	51.5	1,29N,32W	20,30N,28W	Barton	Ammonia	Lamar WWTP	2006			X				
150	Osage River	1031	P	82.0	Mouth	Bagnell Dam	Osage, Miller	Low DO		2006					X		
151	Ozarks, Lake of the	7205	L2	59520	SE SE19,40N,15W		Camden	Fish Trauma		1998				X			
152	Panther Creek	1373	C	7.8	Mouth	13,35N,24W	Polk, Hickory	Low DO		2006					X		
153	Pearson Creek	2373	P	8.0	Mouth	5,29N,20W	Greene	Bacteria	Unknown	2006			X				
154	Pearson Creek	2373	P	8.0	Mouth	5,29N,20W	Greene	Unknown toxicity	Unknown	1998				X			

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155	Peruque Creek	217	P	4.0	Hwy. 40/61	25,47N,1E	St. Charles	Inorganic Sediment	Urban/Rural NPS	2002				X			
156	Peruque Creek	218	C	8.5	25,47N,1E	23,47N,1W	St. Charles	Inorganic Sediment	Urban/Rural NPS	2002				X			
157	Pickle Creek	1755	P	7.0	Mouth	19,36N,7E	Ste. Genevieve	pH	Natural	2006	X						
158	Piper Creek (Town Branch)	1444	P	7.5	Mouth	Hwy 83	Polk	Unknown	Unknown	2006			X				
159	Piper Creek (Town Branch)	1444	P	7.5	Mouth	Hwy 83	Polk	Organic Sediment	Bolivar WWTP, Unknown	1998		VSS to Organic Sediment	X				
160	Pond Creek, Trib. to	2128	C	1.0	Mouth	3,37N,3E	Washington	Inorganic Sediment	Barite Tailings Pond	1998				X			
161	Red Oak Creek	2038	C	9.0	28,42N,4W	16,41N,5W	Gasconade	Low DO		2006					X		
162	River des Peres	1711	C	1.0	Gravois Cr.	Morgan Ford Road	St. Louis City	Chloride		2006					X		
163	River des Peres	1711U - 001	U	U	at University City		St. Louis	Chloride		2006					X		
164	Roubidoux Creek	1512	P	4.0	Mouth	25,36N,12W	Pulaski	Low DO		2006					X		
165	Saline Creek, Trib. to	2859U	U	U			Madison	Nickel	Madison Mine	2006	X						
166	Salt River	91	P	29.0	Hwy. 79	Re-Reg Dam	Pike, Ralls	Mercury	Atmospheric Deposition	2002				X			
167	Sandy Creek	652	C	3.0	Mouth	19,66N,17W	Putnam	Unknown		2002				X			
168	Schuman Park Lake	7280	L3	5	02,37N,08W		Phelps	Mercury	Atmospheric Deposition	2002				X			
169	Shaw Branch	2170	C	2.0	Mouth	20,36N,5E	St. Francois	Cadmium	Federal AML	2006	X						
170	Shaw Branch	2170	C	2.0	Mouth	20,36N,5E	St. Francois	Lead	Federal AML	1994	X						
171	Shaw Branch	2170	C	2.0	Mouth	20,36N,5E	St. Francois	Inorganic Sediment	Federal AML	1994				X			
172	Shibboleth Creek	2120	C	3.0	14,38N,3E	21,38N,3E	Washington	Inorganic Sediment	Barite Tailings Pond	1998				X			
173	Shoal Creek	3231	C	4	12,23N,29W	Hwy. 86	Barry	Low DO		2006					X		
174	Sni-a-Bar Creek	399	P	32	Mouth	30,48N,29W	Lafayette, Jackson	Low DO		2006					X		
175	South Blackbird Creek	655	C	13.0	2,64N,17W	18,65N,18W	Putnam	Ammonia	Unknown	2006			X				

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176	South Fabius River	71	P	61.5	24,59N,6W	29,62N,11W	Marion, Knox	Bacteria		2006					X	X	Corrected name from Fabius River, WBID and segment description.
177	South Fork Salt River	142	C	32	Audrain Co. Line	5,49N,4W	Audrain	Low DO		2006					X		
178	South Grand River	1249	P	62.5	Mouth	02,44N,33W	Henry, Cass	Bacteria		2006					X		
179	Spring Branch (Creek)	3708	P	7.4	02,34N,06W	Hwy. 32	Dent	Organic Sediment	Salem WWTP	1994				X			
180	Spring Branch (Creek)	3708	P	7.4	02,34N,06W	Hwy. 32	Dent	Low DO	Salem WWTP	1994				X			
181	Spring River	3160	P	58.5	State Line	20,28N,27W	Jasper, Lawrence	Bacteria	Urban/Rural Point Sources/NPS	2006			X				
182	St. Johns Ditch	3138	P	35.0	29,23N,15E	25,28N,13E	New Madrid, Scott	Mercury		2006					X		
183	St. Johns Ditch	3138	P	35.0	29,23N,15E	25,28N,13E	New Madrid, Scott	Bacteria		2006					X		
184	Ste. Louise, Lake	7055	L3	87	SW SW27,47N,02E		St. Charles	Bacteria	Urban runoff	2002				X			
185	Stevenson Bayou	3135	C	14	33,25N,16E	31,27N,17E	Mississippi	Low DO		2006					X		
186	Stinson Creek	710	C	9.0	Mouth	16,47N,9W	Callaway	Low DO	Fulton WWTP	1994				X			
187	Stinson Creek	710	C	9.0	Mouth	16,47N,9W	Callaway	Organic Sediment	Fulton WWTP	1994				X			
188	Stockton Branch	1361	C	5.0	Mouth	4,34N,26W	Cedar	Low DO		2006					X		
189	Straight Fork	959	C	6.0	6,43N,17W	36,43N,18W	Morgan	Chloride		2006					X		
190	Straight Fork	959	C	6.0	6,43N,17W	36,43N,18W	Morgan	Low DO		2006					X		
191	Strother Creek	2751U	U	U			Reynolds	Zinc	Buick Mine	2006	X						
192	Sugar Creek	686	P	5.0	Mouth	Sugar Cr. Lake Dam	Randolph	Low DO		2006					X		
193	Table Rock Lake	7313	L2	43100	NW NW22,22N22W		Stone	Nutrients	Point Sources/NPS	2002	X						
194	Taneycomo, Lake	7314	L2	1730	SW NE8,23N,20W		Taney	Low DO	Table Rock Dam	1994			X				
195	Trib. To Red Oak Creek	3360	P	0.5	Mouth	35,42N,5W	Gasconade	Low DO		2006					X		
196	Trib. To Red Oak Creek	3361	C	1.5	35,42N,5W	27,42N,5W	Gasconade	Low DO		2006					X		

No.	Water Body Name	WBID	Class	Length/ Area	From	To	County	Pollutant	Source	Year Listed	Listing Approved	Approved Pollutant Change	Listing Approved, Segment Added by EPA	Restored by EPA	Added by EPA	Change from EPA Proposed List	Comment
197	Troublesome Creek	74	C	34	15,59N,7W	5,61N,10W	Marion, Knox	Low DO		2006					X	X	Corrected WBID and segment description.
198	Turkey Creek	3216	P	7.0	State Line	35,28N,33W	Jasper	Cadmium	Multiple AMLs	2006	X						
199	Turkey Creek	3216	P	7.0	State Line	35,28N,33W	Jasper	Bacteria		2006					X		
200	Turkey Creek	3282	P	2.4	Mouth	Hwy 47	St. Francois	Cadmium	Mine Tailings	2006			X				
201	Turkey Creek	3282	P	2.4	Mouth	Hwy 47	St. Francois	Zinc	Mine Tailings	2006			X				
202	Turkey Creek	3282	P	2.4	Mouth	Hwy 47	St. Francois	Lead	Mine Tailings	2006			X				
203	Village Creek	2863	P	1.5	Mouth	5,33N,7E	Madison	Inorganic Sediment	Mine La Motte AML	2006	X						Corrected year of listing from 1994 to 2006.
204	Village Creek	2863	P	1.5	Mouth	5,33N,7E	Madison	Manganese	Mine La Motte AML	2006	X						
205	Village Creek	2863	P	1.5	Mouth	5,33N,7E	Madison	Lead	Mine La Motte AML	2006	X						
206	Village Creek	2864	C	3.0	5,33N,7E	34,34N,7E	Madison	Inorganic Sediment	Mine La Motte AML	1994				X			
207	Walt Disney Lake	7137	L3	18	05,57N,18W		Linn	Chloride		2006					X		
208	Warm Fork Spring River	2579	P	12.0	State Line	25,23N,6W	Oregon	Bacteria	Unknown	2006			X				
209	Watkins Creek	1708	C	3.5	Mouth	Hwy. 270	St. Louis City, St. Louis	Bacteria	Urban runoff	2006	X						
210	Watkins Creek	1708	C	3.5	Mouth	Hwy. 270	St. Louis City, St. Louis	Chloride		2006					X		
211	Weldon River	560	P	42.0	Mouth	State Line	Grundy, Mercer	Bacteria		2006					X		
212	West Fork Black River	2755	P	31.7	Mouth	25,33N,03W	Reynolds	Nutrients	Doe Run West Fork Mine	1998				X			
213	West Fork Drywood Creek	1317	C	5.5	Mouth	State Line	Vernon	Low DO		2006					X		
214	West Fork Locust Creek	612	P	17.0	Mouth	Hwy. 67	Linn, Sullivan	Unknown		2002				X			
215	West Fork Locust Creek	613	C	17.0	Hwy. 6	33,64N,21W	Sullivan	Unknown		2002				X			
216	West Fork Medicine Creek	623	P	40.0	9,61N,22W	State Line	Grundy, Mercer	Unknown	Unknown	2006	X						

No.	Water Body Name	WBID	Class	Length/ Area	From	To	County	Pollutant	Source	Year Listed	Listing Approved	Approved Pollutant Change	Listing Approved, Segment Added by EPA	Restored by EPA	Added by EPA	Change from EPA Proposed List	Comment
217	West Fork Medicine Creek	623	P	40.0	9,61N,22W	State Line	Grundy, Mercer	Bacteria		2006					X		
218	West Fork Niangua River	1175	P	7	33,32N,18W	33,31N,18W	Webster	Low DO		2006					X		
219	West Yellow Creek	599	C	43.0	29,56N,19W	14,61N,19W	Sullivan	Low DO		2006					X	X	Corrected segment description.
220	Whetstone Creek	1504	P	13	Mouth	21,29N,13W	Wright	Low DO		2006					X		
221	Willow Branch	0654U	U	0.6 (U)	Mouth	22,66N,18W	Putnam	Unknown		2002				X		X	Added length and locational information.
222	Willow Fork	955	C	6.5	36,45N,17W	29,45N,17W	Moniteau	Low DO		2006					X		
223	Willow Fork, Tributary to	956	C	0.5	Mouth	27,45N,17W	Moniteau	Low DO	Tipton WWTP	2006	X						
224	Wilson Creek	2375	P	18.0	Mouth	16,29N,22W	Greene	Unknown toxicity		2002				X			
225	Wilson Creek	2375	P	18.0	Mouth	16,29N,22W	Greene	Bacteria		2006					X		
226	Wolf Creek	2879	C	8	Mouth	29,36N,6E	St. Francois	Low DO		2006					X		
227	Wolf Creek, Trib. To	3589	C	1.5	Hwy. 32	Hwy. D	St. Francois	Low DO		2006					X		
228	Woods, Lake of the	7436	L3	3	NE,02,48N,12W		Boone	Mercury	Atmospheric Deposition	2002				X			

* There was no length/area specified on the 2002 list for this water body/pollutant pair.
NA = This water body/pollutant pair was not on the 2002 303(d) list.
/ = This water body/pollutant pair was not identified by MNDR as impaired on 2004/2006 303(d), and as such, there is no length/area to record.
( ) = For reference, the segment length/area according to Table H in Missouri's water quality standards in included in parentheses. In these instances, the length/area of the listed segment is that identified by MDNR.
(U) = The water body is unclassified, and as such, the length identified is not the "classified" segment length.
AML = Abandoned Mine Land
NPS = Non Point Source